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# SHORT WAVE LISTENER AND TELEVISION REVIEW



DEVOTED TO  
SHORT WAVE RADIO RECEPTION  
AND AMATEUR TELEVISION

JANUARY 1951  
VOLUME 5 · NUMBER 1

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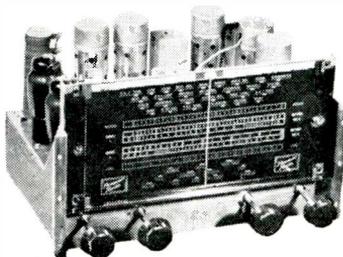
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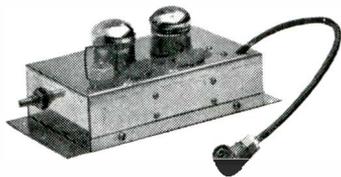
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# THE SHORT WAVE LISTENER AND TELEVISION REVIEW

VOLUME 5

JANUARY 1951

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EDITORIAL

## Greetings

It is again the season of the year when it is our privilege and our pleasure to offer our readers, our trade friends and the members of BSWL the good wishes of *Short Wave Listener & Television Review* for a safe and prosperous New Year—with the hope that before 1951 strikes they will have had a Happy Christmas.

For us, it is a matter of looking forward to set new targets and back to see what we have achieved. In a competitive world—and may we say that we accept competition as widening the field for *Short Wave Listener & Television Review*, particularly as much of the competition is based on the slavish and uninspired imitation of ideas, features and methods first introduced in our pages—we have extended our appeal during the last twelve months, while the membership of the British Short Wave League has continued to show a steady increase. These are significant facts, since this paper within its own field is a highly specialised publication and BSWL membership is not cheap.

But there is always room for improvement, scope for expansion and the urge to do better, both on paper and in terms of wider reader interest and support. Within the coverage now established for *Short Wave Listener & Television Review*, these will continue to be our objectives through the coming year.

For our part, we would ask that more readers consider BSWL membership—for the full subscription of 17s. 6d., they get *Short Wave Listener & Television Review*, plus BSWL *Review* (making it a 52-page monthly of vital interest to all keen SWL'S) with the advantages of membership of an active and established SWL organisation.

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A COMPANION PUBLICATION TO "THE SHORT WAVE MAGAZINE"—  
THE JOURNAL FOR THE RADIO EXPERIMENTER AND TRANSMITTING AMATEUR

# Transmission for Beginners

## PART III

### THE AERIAL SYSTEM

AERIALS for short-wave transmission and reception have probably been written about at greater length than almost anything else in radio. It is obviously quite impossible to cover even the bare fundamentals of this huge subject in the course of three or four pages. I will therefore confine myself to an attempt to make clear some of the simplest basic facts with which everyone should become really familiar before attempting to erect an aerial and to feed power into it.

Since the universal employment of short wavelengths for DX communication purposes, it has become normal practice to use aerials of the Hertz (or self-resonant) type rather than of the Marconi (or tuned) type. This, like many of my succeeding statements, is an over-simplification, but it is made necessary by the dictates of space.

The simplest Hertz aerial is a length of wire cut to very nearly (but not exactly) half a wavelength—at the wavelength to be used for transmission, naturally—and fed with RF power at the centre by means of a low-impedance line. This is, in fact, the *dipole*, from which all other types are developed. Its physical length is roughly 0.495 of a wavelength; for the 14 mc band this implies a length of roughly 33 feet.

In the centre it is broken by an insulator, and a 72-ohm line, either co-ax or flat twin, is connected, one conductor to each half of the dipole. This line may be of almost any length provided that it is terminated at the lower end by an impedance of the order of 72 ohms, which, in practice, is represented by a single-turn link.

Couple such a link to any properly adjusted transmitter, tune the transmitter to the wavelength for which the dipole is cut, and power will be fed up the line to the centre of the aerial. This

*(Without doubt, the main factor determining station efficiency is the aerial—the type chosen for the purpose intended, and how it is erected and energised. Fortunately, the fundamental conceptions in aerial design are quite simple and straightforward, as this article shows. The prospective amateur transmitter will find that a sound grasp of the principles enunciated here will enable the more complicated radiating systems to be easily understood, particularly after some practical experience has been gained with these simple types.*  
—Editor.)

aerial will then radiate with maximum efficiency in the two directions at right-angles to the plane in which it is hung (see Fig. 2a).

This, of course, is just about as simple as they come! Nevertheless, it is this same aerial on which many of the world's DX records have been broken, and contests won—so do not despise the humble dipole or you will be making a great mistake.

### Voltage Feed

The current-fed dipole's one disadvantage is that it is essentially a one-band affair. If it is cut for 14 mc it cannot be used for 28 or 7 mc. That same length of wire *could* be used for 28 mc, but not when it is fed in the centre in that fashion.

If we use voltage feed (Fig. 1b) and tuned feeders, then we have an aerial suitable for more than one band. If the top is 33 ft. in length, it behaves in just the same manner as the original dipole on 14 mc—although its method of feeding is different—but it will also tune up and radiate energy on twice the frequency, that is to say 28 mc.

Note, though, that its main directions of radiation will not now be the same (Fig. 2b). Where we had maxima before, at right-angles to the plane of the wire, we now have minima. The maxima are inclined at 54 degrees to the plane of the wire, and there are four of them. This is the essential difference between a full-wave aerial and a dipole. Look on the full-wave aerial, if you like, as two dipoles in series, but operating in opposite phase, and you should get a mental picture of the two dipoles, each trying to radiate at right-angles, but with their fields of force "repelling" each other, if one can borrow that term for a simple explanation.

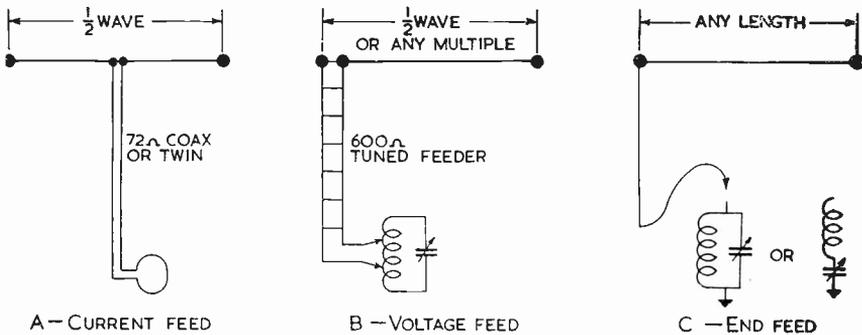


FIG 1

If a tuned circuit were inserted half-way along this full-wave aerial, so as to produce a phase-change, then its two halves would behave like dipoles "in phase" and would both radiate at right-angles to the wire, reinforcing the diagram of Fig. 2a by giving sharper maxima.

For the voltage-feed method shown, using open-wire tuned feeders (usually known as a "Zepp") we have to provide a tuned circuit at the bottom end. This is coupled to the tank circuit of the transmitter, and the optimum position for tapping the feeders will vary with their length. For certain lengths of feeder, in fact, it will be necessary to use the condenser and coil in series instead of in parallel.

**"End-feeding"**

Any length of wire can be made to radiate by terminating it correctly at the transmitter end and by tuning it against a direct earth connection or a counterpoise, the latter merely being a further length of wire erected near to the ground.

The system then become a *Marconi* type of aerial, although when the counterpoise is used you can regard the whole thing as a Hertz, bent into curious shapes and fed at some point on its length with the right proportions of current and voltage.

If the whole piece of wire (which, this time, means the top *plus* the downlead) can be made to total half a wavelength or any multiple of half a wavelength, then it may be tapped on to a tuned circuit and voltage-fed. In the case shown in Fig. 1c it would simply be tapped on or near the top of the tuned circuit and voltage-fed.

If, on the other hand, it more nearly

resembles an odd number of quarter-waves, then it will have to be fed from the right hand, or series-tuned, circuit, and the efficiency of the earth connection will become of great importance. In the other case it hardly matters whether an earth is connected or not.

**Directional Effects**

The four sketches in Fig. 2 show the directions or maximum radiation from four types. The dipole and the full-wave aerial have already been dealt with. The longer piece of wire, two waves long, will radiate best at angles of 36 degrees to the plane of the wire. As we make our "long wire" longer and longer still, these main lobes will veer round more and more towards the plane of the wire itself. When we have one that is four or more wavelengths long, the maximum radiation will be practically "off the ends."

**Choice of Direction**

Now the most important thing for the individual transmitting amateur to do is to study his location, get to know the directions in which it is possible for him to run a wire, and then erect one of the most suitable length. The ideal arrangement, if you can only use one simple length of wire, is to erect one which is half a wavelength long on the lowest frequency band you propose to use. If you are fortunate enough to have a clear run of 136 feet, then you have a half-wave aerial for the 3.5 mc band. Suppose this runs North and South—you are again fortunate if it does!

On 3.5 mc this arrangement will radiate strongly to East and West; in 7 mc, as a full-wave, its best directions will be roughly NW, NE, SE and SW;

and on 14 mc almost the same, though somewhat sharper. By the time it is used on 28 mc it will not be much good except for South Africa and South America, but then a dipole for covering East and West on that band can probably be accommodated as well.

If you are less fortunate and your maximum length is 67 ft., then you have your half-wave on 7 mc. To use it on 3.5 mc you will have to tune it against direct earth, and you need not worry about its efficiency on that score. It won't completely fill the bill, compared with the proper length of wire, but many world-wide contacts on 3.5 mc have been achieved by people with short aerials.

### Beam Systems

If you refer back to Fig. 2d, you will note that one half of a dipole's radia-

tion of wire, taking such a time to traverse the distance (roughly a quarter-wave) and to get back to the dipole again that it is, by then, exactly in phase with the energy leaving the dipole, which is therefore reinforced.

It is very difficult to explain the operation of aerials without going any distance into theory, but possibly this extremely simple introduction will have persuaded you that they obey well-known natural laws, that there is nothing mysterious or obscure about them, and that if you erect—properly—an aerial which is supposed to do this and that, the chances are that it *will* do this and that, precisely.

Needless to say, all our childhood's warnings must be regarded! Such obvious precautions as erecting the aerial (when you can) in a completely clear space, over flat ground and well

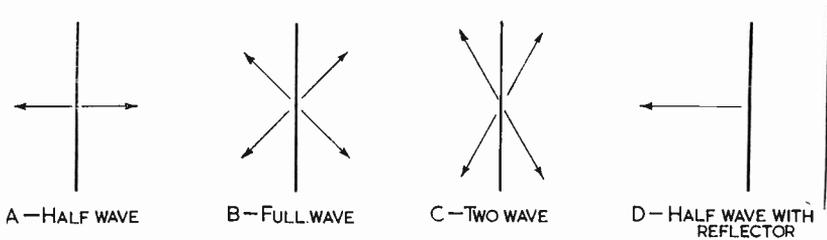


FIG 2

tion can virtually be cut off by using a reflector behind it. The well-known "H" aerial for television is an example of this, although, of course, it happens to be vertical. The reflector is simply another piece of wire, or tube, cut to a critical length and mounted at a critical distance behind the dipole. It is not *fed* with energy, but is parasitically excited by radiation from the dipole. The simplest explanation I can think of is this: Suppose the dipole of Fig. 2d runs North and South. Then energy leaving it to travel West is unimpeded. Energy travelling East, however, is reflected back by the extra piece

insulated, must of course be taken.

In odd cases when the wire cannot be strung up in a straight line, the ends may be allowed to hang down a foot or so; in other cases there is no option but to bend the wire—sometimes even at right-angles; and in very many cases the height that is most desirable cannot be attained. In such circumstances you will not obtain the full theoretical performance; but you may be cheered up by knowing that some of the amateurs with seemingly impossible situations for aerial erection have still managed to cover the world, by dint of good-quality signals and intelligent operation.

### THE WINTER CALL BOOK

The latest (Winter) edition of the *Radio Amateur Call Book* will be available for distribution in this country by about the middle of January. Orders, at 16s. 10d post free, can be placed with Gage & Pollard, who are the agents for the U.K. and Europe.

### VALVE REPLACEMENT GUIDE

Of particular interest to Dealers is the new Mullard Valve Replacement Guide, now available at 2s. 6d. from wholesalers. This edition of the Guide covers all receivers manufactured between the years 1933 and 1949, inclusive, and gives full replacement data.

# THE RADIO AMATEURS' EXAMINATION

WE reproduce below the Paper set for the Radio Amateurs' Examination of May, 1950, in which many of our readers will be interested, particularly those who contemplate taking the 1951 Examination. The Paper is, as always, a fair and reasonable test of the basic knowledge which should be possessed by all who aspire to the privilege of an amateur transmitting licence. This is proved by the fact that the results show a failure rate of about 21% only of 833 candidates—which is rather better than the 29% failed out of the 898 candidates who sat in 1949.

The Examiner's Report on the 1950 R.A.E. can be summarised as follows: "The general standard . . . was fairly high. Practically all questions were attempted . . . and were well done by most candidates . . ."

From this, it is evident that candidates are being better prepared for the Examination, and that they are approaching it with a much clearer idea of how the questions should be answered.

As in previous years, specimen answers to the questions below will appear in forthcoming issues of *Short Wave Listener & Television Review*.

## CITY AND GUILDS OF LONDON INSTITUTE

### DEPARTMENT OF TECHNOLOGY

1950

### 55—RADIO AMATEURS' EXAMINATION

Wednesday, May 10th, 7 to 10 p.m.

*All questions should be attempted. Use should be made of diagrams where applicable. The maximum possible marks obtainable is affixed to each question.*

1. With the aid of a diagram, describe the essential features of a crystal-controlled radio transmitter suitable for the 14 Mc/s frequency band and indicate the method of keying. (15 marks.)
2. Describe a superheterodyne receiver suitable for the reception of C.W. signals over the frequency range 1 to 20 Mc/s. Illustrate your answer with a block diagram. (15 marks.)
3. State what requirements have to be met under the non-interference conditions of "The Postmaster-General's Licence To Establish An Amateur Wireless Station." (15 marks.)
4. Describe a heterodyne frequency meter and explain how it is used to measure the frequency of a transmitter. (15 marks.)
5. What is understood by "radiation characteristics"?  
With the aid of diagrams, describe the radiation characteristics of a horizontal dipole with and without reflector. (10 marks.)
6. Explain:—  
either (a) the meaning of class A, class B and class C amplification,  
or (b) the method of neutralizing a power amplifier. (10 marks.)
7. Two inductors of 10 and 20 microhenrys are connected in series; two others of 30 and 40 microhenrys are also connected in series. What is the equivalent inductance if these series combinations are connected in parallel? Assume that there is no mutual induction. (10 marks.)
8. (a) What is the relation between the frequency and the wavelength of a radio wave?  
(b) What are the frequencies corresponding to wavelengths 30 km., 150 m., and 10 cm.?  
(c) Why are wavelengths shorter than 5 metres generally unsuitable for long distance communication? (10 marks.)

# Three-Stage TV Preamplifier

ANOTHER USE FOR THE RF-25  
UNIT

By W. N. STEVENS (G3AKA)

**E**NTHUSIASTS, living in the fringe areas, who require an efficient pre-amplifier for their TV receivers will find that the RF25 unit can be quite easily converted to provide the extra gain required. The conversion and application of the unit as described is suitable where a simple receiver is in use, or where only one RF stage is provided—this being inadequate for local conditions. A preamplifier of this description should *never* be required in locations within the service area, but is particularly useful where long-range reception is necessary.

As purchased, the RF25 unit is a three-stage circuit comprising an RF amplifier, mixer and local oscillator—all valves being of the VR65 (SP61) type. The coverage is 40-50 mc, selection of spot frequencies being determined by the 5-position selector switch. Unless the trimmers have been tampered with, the actual spot frequencies to which the circuits have been set are (in 1-through-5 sequence) 43, 44.9, 46.8, 48.75 and 50.5 mc. This information may be of assistance when it comes to aligning the converted unit.

Little more need be said regarding the basic unit, since most readers will already be fairly conversant with the circuit—which appears in its original form in Fig 1. The conversion to a pre-amplifier for the Alexandra Palace signals consists of (1) Retaining V1 as an RF amplifier, but providing a gain control; (2) Converting the mixer stage as a further RF amplifier; and (3) Removing the Colpitts oscillator and converting V3 to a third RF amplifier.

The first task is to remove the switching assembly—noting, however, that for the time being the grid condensers (both fixed and variable) should be left *in situ*. When this job has been carried out, the three stages can be tackled individually.

## The First RF Stage

This remains substantially unaltered, since its original purpose accords with the aim of the conversion, *i.e.*, to provide RF amplification over a wide bandwidth. However, since some form of gain control will obviously be required, it will be convenient to put it in at this stage. Reference to Fig. 2 (the complete circuit after modification) shows that the gain control is fitted in the cathode. One of the disadvantages of fitting the gain control in an RF stage is that variations of this control affect not only amplification, but also the grid input characteristics, resulting in a loss of wideband characteristics. However, in the system shown, these disadvantages are reduced considerably, due mainly to the 33-ohm resistor in the cathode circuit. Negative feedback is developed across this resistor to the extent that variations of the gain control do not seriously affect the grid characteristics of the valve.

The actual modifications are simple. The anode and screen-grid circuits remain unchanged, the only alterations being in the cathode. First, remove the bias resistor R1 and break the cathode end of C6. The free end of C6 is then connected to the three new resistors; a 220,000-ohm resistor which is taken to the junction of R2/R26/C8; a 33-ohm resistor to the V1 cathode; and a 220-ohm resistor which is taken to the 5,000-ohm potentiometer. The potentiometer is, of course, the new gain control, and this may either be fitted as a pre-set or a panel control. If a 5,000-ohm item is not to hand, a substitute value could be used, but it should be realised that since the SP61 is of the short grid-bias type, the actual range of control should be restricted. Hence, use the value specified where possible. It is better to fit the control as a pre-set, since a "contrast" setter will already be available as a panel control on the main receiver.

## The Second Stage

This stage, being designed as a mixer, needs more attention. Starting on the feed circuits, remove L3 completely and replace with a 4,700-ohm load resistor. Then disconnect the anode connection of R8 and take it to the junction of R5/R27/C21. This simply means that the R5 resistor for the screen feed is shunted with the 10,000-ohms resistor, and it could be entirely removed if considered necessary.

The components in the cathode circuit are all removed entirely with the excep-

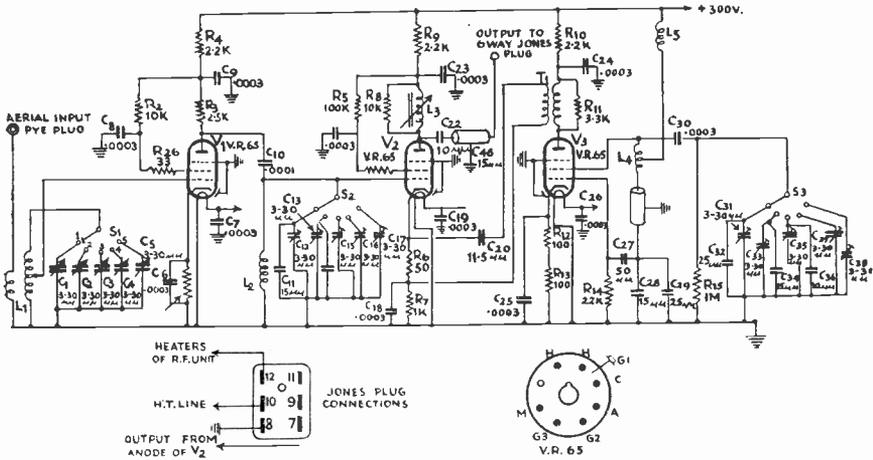


Fig. 1. Circuit complete of the RF25 Unit, unmodified.

tion of C18; this is re-connected direct to the cathode pin and shunted with a new bias resistor (220 ohms).

**The Third Stage**

Ignoring for the moment the V2-V3 coupling details, the final stage can be tackled. Remove T1 and R11, inserting a new anode load resistor of 4,700-ohms. Then remove the grid and screen-grid components L5, L4, C30, C27, C28, C29, R15. Insert the screen-grid feed resistor, parasitic stopper resistor and screen-grid decoupling condenser as shown in Fig. 2, noting that the latter component can be the C30 which has been removed from the grid circuit. The cathode circuit can be left unchanged, since the total of 200 ohms resistance is suitable.

At this point, we can revert to the tuned circuits. Obviously, some form of stagger tuning must be employed, since, although the stages have a broad bandwidth, adequate amplification of all the video frequencies must be obtained. To obtain sufficient bandwidth, tightly-coupled band-pass circuits are often used; since, however, the RF25 unit is fitted with parallel tuned circuits, the alteration to this system would only lead to complications. As it is, the new anode load resistors have been made a very low value (4,700 ohms for V2 and V3), and because these resistors are effectively in parallel with the grid circuits, substantial damping results. This, together with stagger tuning the

**ORIGINAL COMPONENTS DELETED**

Resistors : R1, R5 (optional—see text), R6, R7, R11, R14, R15.

Condensers : C1, C3, C4, C5, C13, C14, C15, C16 (re-used in V3 grid circuit), C17, C20, C22, C27, C28, C29, C30 (re-used as V3 screen-grid decoupler), C31-C38, C46 (may be left mounted).

Miscellaneous : L3, L4 (rewound as "L"), L5, T1, S1-S3 assembly.

three tuned circuits, will enable an adequate pass-band to be obtained. Should, however, further damping be required, resistors can be inserted across the tuned circuits as shown in the circuit of Fig. 2. Since stage gain is inversely proportional to bandwidth, the decision must be left to the individual.

The band of frequencies to be amplified is 41.5-48 mc, assuming that either double-sideband or single-sideband reception employing the upper sideband is used in the succeeding receiver unit. Successful stagger tuning has been accomplished by tuning the respective stages to 44.5, 41.5 and 48 mc. There are, of course, other sequences which can be used.

The reader, having decided on this point, can then remove all the grid condensers (fixed and variable) that are redundant. In this respect, it is worth noting that each of the original switching positions had two items in common—the coil and a variable condenser. On certain positions a third factor—a fixed condenser—was brought into circuit.



V<sub>3</sub> stages are coupled by a new 100  $\mu\mu\text{F}$  condenser, having removed the existing output leads; that is, C<sub>22</sub> is removed and the new condenser inserted between the V<sub>2</sub> anode and V<sub>3</sub> grid.

To make a neat job, the existing Jones plug can be used to anchor the

output and supply terminals. The HT line and heater supplies will, of course, remain unaltered. All that remains is to disconnect the lead from pin 7 of the plug to C<sub>46</sub> and re-wire it to the anode of V<sub>3</sub>, via a new 100  $\mu\mu\text{F}$  condenser, as shown in the circuit reference.

#### SOME CORRECTIONS

With heads bowed in shame (for it is the first time it has ever happened), we have to report that a station photograph was wrongly captioned in our last issue. That picture on p.420 should have described G3CLM, Barking, and not G3CLM. Our apologies to them both. And while we are eating dirt, the value of C<sub>5</sub> in the circuit diagram on p.403, December, was omitted; it should be .001  $\mu\text{F}$ . And the two condensers across L<sub>1</sub>/C<sub>1</sub> in that circuit are actually C<sub>2</sub>, C<sub>3</sub>, also both .001  $\mu\text{F}$ .

#### NEW CATALOGUE

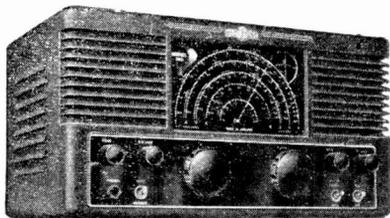
We are glad to draw readers' attention to an excellent catalogue of surplus bargains now available from the firm of Lyons Radio, Ltd., 3 Goldhawk Road, Shepherds Bush, London, W.12.

#### BSWL CERTIFICATES

The British Short Wave League has recently introduced an attractive series of achievement certificates for the keen SWL. Available only to BSWL members, these are the HAZ, HBC, NACA, VHFCH and HCC. Of these, Heard All Zones is undoubtedly the most difficult, but North American Call Areas and the Hundred Country Club give many members a good chance, without being so easy as to rob them of their value as achievement awards. The others are Heard British Commonwealth and VHF Counties Heard. All who belong to the League also receive a Membership Certificate on enrolment. If you are interested, write The Manager, British Short Wave League, 53 Victoria Street, London, S.W.1, for details of membership.

## EDDYSTONE

### COMMUNICATIONS RECEIVERS



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# Amateur Television Transmission

## PROGRESS AND RESULTS

By M. BARLOW (G3CVO)

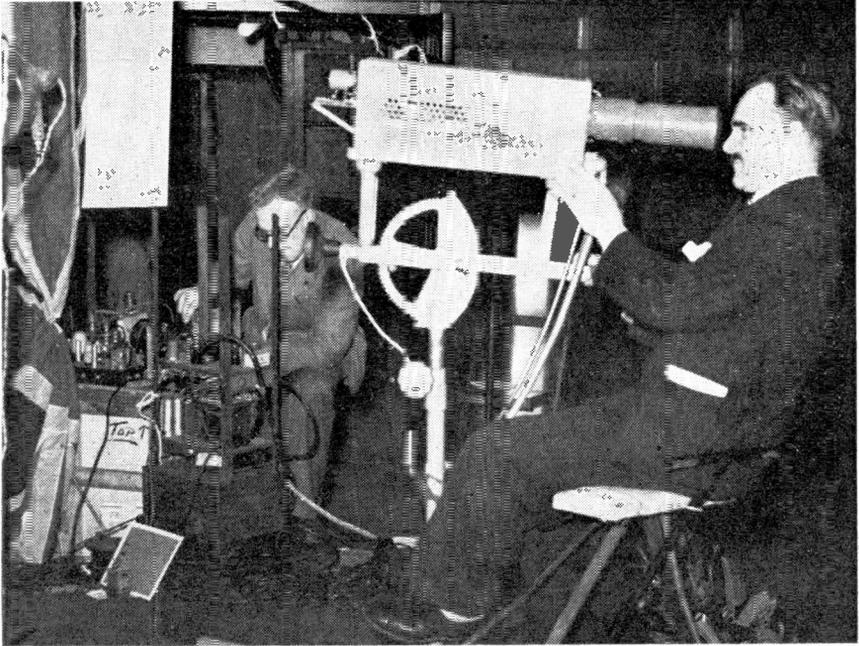
OWING to the printing dispute and its attendant troubles, it has not been possible for *Short Wave Listener and Television Review* to print our recent contributions. Nevertheless, the Club has not been idle, and several public shows have been given, reports of which may have been seen in the daily Press.

(In our issue for June last, we drew attention to the British Amateur Television Club. Since those notes appeared, the B.A.T.C. has made considerable progress. Full transmitting facilities have been secured, new equipment designed, and many successful closed-circuit demonstrations given; these culminated in the daily public performances at the Amateur Radio Exhibition in London during November 23-25. This considerable undertaking was a triumph for the Club and amateur closed-circuit TV. The Exhibition demonstrations were closely followed by many enthusiastic viewers, who were greatly impressed by the excellence of the picture and the efficiency with which the whole performance was handled. The Honorary Secretary of the B.A.T.C. is M. Barlow, G3CVO, Cheyne Cottage, Dukes Wood Drive, Gerrards Cross, Bucks.—Editor.)

At a demonstration given at Letchworth we were fortunate to be able to put Joan Gilbert and Ronnie Waldman on TV—our way!



G3CVO, honorary secretary of the British Amateur Television Club, in front of the camera. He acted as producer and announcer for the frequent daily performances given during the period of the Amateur Radio Exhibition, November 22-25. Those who appeared before the camera were mainly unrehearsed members of the audience, and some of them proved to be remarkably photogenic.



General impression of the B.A.T.C. set-up for the amateur TV demonstration at the Amateur Radio Exhibition, with G5ZT on the camera and SWL P. Parkin making sure the pulse generator is ticking. The proceedings, which were very successful and a great credit to the Club, were conducted in full view of an interested public, with presentation of the platform scene on a remote screen in another part of the Exhibition.

### Prospects

The news that the GPO have granted permission for TV transmissions in the 3, 6, and 13 cm amateur bands has been received with enthusiasm, tempered by the thought that producing RF in quantity, and modulating it with Video, is going to be *some* problem at these frequencies. Those of the Club members who are RF experts are getting to work, and at the time of going to press one of our members has a complete 3 cm transmitter and receiver in operation, and has successfully transmitted still pictures over a distance of some 150 feet in his garden.

In order to simplify research, work is being concentrated on the 3 and 13 cm bands, for which there is a considerable amount of surplus gear available. Frequency modulation of klystrons is planned, which means that, in view of the lower power available (of the order of milliwatts), high-gain aerials will be necessary, and anything in the way of all-round radiation will be out of the question. Also, of course, it will *not* be possible to "equip all the local TV receivers with a small converter in a

little black box to receive the amateur transmissions," as one over-enthusiastic newspaper thought!

### Exhibition Demonstration

The Amateur Radio Exhibition provided us with a good opportunity to demonstrate our equipment, and in spite of lack of time, a close circuit Iconoscope camera was set up, televising half-hour demonstrations to a viewing screen 175 feet away. All the equipment was loaned by G2DUS, and operated by him and Harold Jones, G5ZT, with Peter Parkin. G3CVO did the interviewing in front of the cameras, and various other members also gave their services, both on the stand and also by producing "Test Card 1" and a card saying "Normal Transmission Will Be Resumed As Soon As Possible"!

Great interest was shown in our very public "studio"; the scene was lit by four No. 2 Photofloods at about 3 feet from the "actors," causing comment from several who found it rather warm! The camera was perched somewhat precariously on the edge of the stand, but

only once did the camera operator fall backwards into the flowers. Owing to the non-arrival of the counterbalancing weights for the microphone boom, two bricks wrapped in vivid green paper were pressed into service instead; there was no doubt that the show *really* was an amateur effort!

Amongst the many visitors who showed a keen interest in the stand were the Postmaster General himself, and a representative of RCA Ltd., who is arranging to import 12 more 5527 Iconoscopes for us. Messrs. AVO Ltd.

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very kindly donated an electronic Test Meter for our use, and other firms have also contributed from their range of products.

There is no doubt that this Exhibition has given the amateurs who visited it a good idea of what we have already done and are hoping to do in the future. Immediate plans include the construction of two more live camera units within three months, depending on the supply of camera tubes, and getting a 3 cm FM TV station on the air as soon as licence details are announced.

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# Television for Beginners

## AN OUTLINE OF THE SYSTEM

### CIRCUITRY OF WAVEFORM GENERATORS AND THE THYRATRON

#### PART VIII

By W. N. STEVENS (G3AKA)

**I**N the last issue the action of the sync separator, the manner in which the modulation frequencies are filtered out and the separation of the frame and line pulses came under discussion. These pulses are radiated by the transmitter, and utilised in the receiver, in order to trigger the scanning generators (or, as sometimes called, sweep oscillators) and ensure accurate synchronisation of the scanning characteristics at both the transmitting and receiving ends.

We have already examined the nature of the sawtooth waveform required for application to the time base deflection systems and also the sum effect of the two time bases in producing a raster on the picture tube (*see* Part III). It now remains to see how these waveforms are produced in the television receiver.

Since the line time base must operate at a frequency of 10,125 c.p.s. and the frame time base at 50 c.p.s., two separate generators are required—the principles of both, however, are similar. It will be recalled that the outputs from the time bases are fed to the deflection coils (or in the case of electrostatic tubes, the deflector plates), the magnetic fields thus set up deflecting the electron beam. In order that the spot be deflected at constant velocity the deflection current must rise linearly. In practice, with the methods commonly used, the production of a completely linear output is not possible; the main deterrents are the characteristics of the amplifiers and output transformers. Two methods are used to counteract this distortion—(1) By introducing counter-distortion in the amplifier, or (2) Introducing a certain amount of distortion in the oscillator so that the inherent distortion in the output circuits will enable a linear deflection current to be obtained.

Before leaving this subject for the time being, it is opportune to note that time bases for electrostatic tubes must

provide a *voltage* output, and, to obtain the usually necessary phase change, push-pull amplifiers are called for. On the other hand, magnetic tubes require a current waveform for deflection; this is simple enough because the output from the generator is seldom sufficient in amplitude and the necessary amplifier stage has its output used as a current waveform. The pair of coils used enables the phase change of  $180^\circ$  to be obtained without the use of push-pull deflection amplifiers.

#### Basic Generator

The generation of a sawtooth waveform is shown basically in Fig. 32. At "A" is indicated a resistor and condenser in series, across which a source of DC voltage is applied. Assuming that the condenser is uncharged and the DC potential is then applied, the voltage across C will gradually build up—being initially limited by the resistor R—until the slope becomes zero, *i.e.*, a horizontal line. The curve so produced is exponential (Fig. 32b) and its actual rate of rise depends on the time constant C/R; should either component be of larger value, the curve will become flatter (more horizontal) or, if smaller, more rapid (vertically inclined). Therefore, the rate of rise is dependent not on the two components individually, but on their sum.

Now, as we have seen, a *linear* rise is required for the sawtooth waveform, yet the curve of the charging condenser is exponential. The initial portion of the curve, however, is substantially linear, and, should the switch Sw be closed when the applied potential has reached something like 5% of the DC source available, the voltage across C can be restricted to the linear part of the curve. Going a stage further, supposing it were possible to close the switch (to discharge the condenser), every time the potential had reached the pre-arranged voltage a

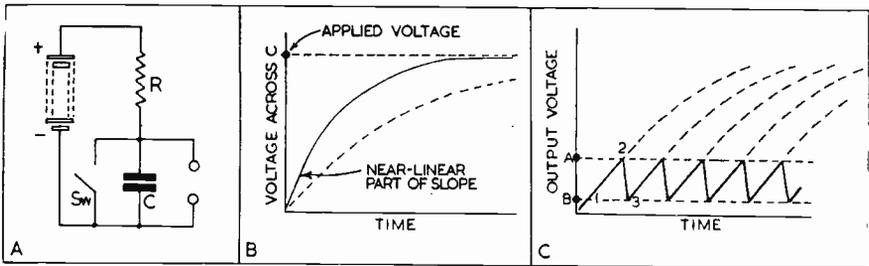


Fig. 32. Generating sawtooth waveform. (a) The basic circuit, (b) Exponential curve produced by the basic circuit; the dotted curve shows the effect of a larger C/R combination. In (c) is the sawtooth waveform, produced by "closing the switch" before the end of the linear portion of the slope is reached. Point "A" indicates the voltage level at which the switch is closed and "B" is the level to which the condenser then discharges.

series of near-linear sawtooth waveforms would be obtained—as shown in Fig 32c.

Although the rise of the sawtooth must be substantially linear, its fall, or decay, need not be so; in fact, it is normally exponential. The ideal sawtooth would not only have a fully linear rise but a decay, or flyback, which was instantaneous. As the sketch of Fig 32c shows, there is a time delay between the discharge and the fall to zero, but providing this is short compared with the time taken for the rise, it is quite satisfactory. The application of the sawtooth in regard to deflecting the scanning spot is simple enough; the rising voltage (point 1 to 2) represents one complete scanning "line" of the raster, and the decay (2 to 3) is the flyback period which separates one line from the next. The flyback is not visible as a trace on the screen because it occurs at a time when the line signal is below black level. In any case, since the spot would travel at a greatly increased speed during this

period, its effect would be considerably minimised.

Getting back to the generation of sawtooth oscillations, it is obviously not practicable manually to operate the switch—at 10,125 times each second it is also humanly impossible! Therefore, some electronic switching method is used, such as a gas-filled valve—the thyatron.

### Soft Valve Generators

The thyatron is similar in appearance to ordinary hard vacuum valves, but has certain fundamental differences. It is a triode operating not in a vacuum, but in a low-pressure gas, and differs from the vacuum triode in this way: Assuming that the grid is given suitable negative bias and the anode potential is gradually increased from zero, no anode current will flow until the anode voltage reaches a certain critical value. At this point, called the gas striking (or firing) voltage, the gas ionises and a heavy

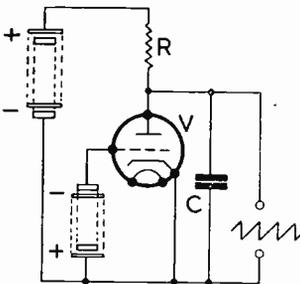


Fig. 33. Basic thyatron sawtooth generator, discussed and explained in the text.

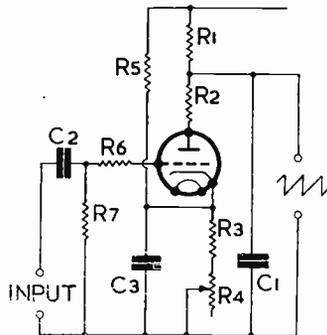


Fig. 34. Practical application of the thyatron in a typical time base generator circuit.

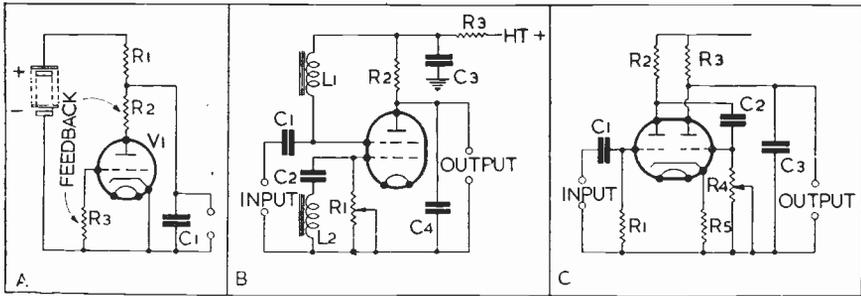


Fig. 35. Hard valve generator. (a) Basic form of hard valve discharge circuit. (b) A blocking oscillator sawtooth generator, in which windings  $L_1$  and  $L_2$  are wound on the same core and work as a transformer. (c) Cathode coupled multivibrator circuit.

anode current flows. In brief, the valve is non-conducting on a low anode voltage but passes current when the anode potential reaches the striking voltage.

The basic generator is shown in Fig. 33. On applying the DC potential, the charging voltage builds up across the condenser  $C$  (and, of course, the valve) until the firing voltage is reached; the condenser then discharges through the thyatron and the whole sequence starts again. By so determining the value of  $R$  and  $C$ , it can be arranged that the thyatron is fired before the linear portion of the rising voltage is reached. In this way the required train of sawtooth waveforms can be obtained electronically.

A practical thyatron oscillator is shown at Fig. 34. The charging components are  $R_1$  and  $C_1$  (corresponding to  $R/C$  in Fig. 33). Negative bias for the control grid is developed across  $R_3/R_4$  and applied to the grid by  $R_6/R_7$ . On application of the anode voltage,  $C_1$  charges up through  $R_1$  until the potential reaches the firing voltage, when  $C_1$  is virtually short-circuited in the manner already described. The resistor  $R_2$  (of small value) is required as a limiting resistance to restrict the discharge current and so prevent damage to the thyatron cathode.

The time taken for  $C_1$  to charge is dependent on the applied anode voltage, the negative bias applied to the grid, the values of  $C_1/R_1$  and the differences between the striking and extinction voltages for the thyatron. This time—in other words, the repetition frequency—is normally controllable in a television receiver by a potentiometer in the cathode circuit ( $R_4$  in Fig. 34). By increasing the value of  $R_4$ , more negative bias is applied to the grid, thus

raising the firing voltage and consequently  $C_1$  will take longer to charge.

Often  $R_1$  is also made variable in order to provide an amplitude control, although this is frequently inserted in the amplifier circuit or the deflection circuit. It should be realised, however, that although variation of  $R_1$  affects the amplitude, it will also affect, to some degree, the frequency. The controls  $R_1$  and  $R_4$  are, to a certain extent, interdependent, as it will be easily seen.

The remaining components require little comment.  $C_3$  is the cathode condenser, inserted to eliminate variations in the thyatron pulsating current;  $C_2$  is simply to block the DC from the preceding circuit;  $R_7$  provides the DC path from grid/cathode; and  $R_6$  is a grid stopper as an aid to stability.

### Synchronisation

Having seen how the sawtooth waveform is produced, the next step is to see how synchronisation is affected. A time base operating under the conditions described above is termed "free-running," but in order to reproduce the transmitted images, the local time bases must not only be operating at the correct frequencies, but the start of each line and each frame must correspond exactly to the times of the transmitted lines and frames.

It has been shown how the discharge time can be varied by adjustment of circuit values—broadly by altering the anode voltage or negative grid bias. Taking an example, assume that -3 volts negative bias is applied to the grid, and that the firing voltage is 60 volts. If the grid bias was altered to, say, -2 volts, not only would the charging time

be reduced, but the thyratron would strike at a lower anode voltage—at around 40 volts.

In other words, it would be simple enough to initiate the discharge at a time when the critical anode voltage was being approached simply by reducing the grid bias. In practice, this is exactly what occurs. By setting the frequency of the generator slightly below that nominally required, the arrival of the *positive-going* sync pulse at the grid lowers the negative bias and so fires or triggers the thyratron. The generator is thus "pulled" into step with the transmitted pulses and so synchronisation is effected.

### Hard Valve Generators

Hard (vacuum) valves may also be used as sawtooth generators, and

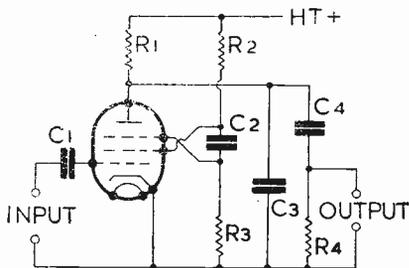


Fig. 36. The transistron oscillator, which can also be used as a hard valve discharge arrangement.

although the same principle of a charging and discharging condenser is used, there are several fundamental differences. As with the thyratron, the valve is connected across the charging condenser (see Fig. 35a), but is in series with an impedance ( $R_2$ ). The valve is biased in such a way that no anode current flows through the charging-up period, but when the required amplitude is reached, *i.e.*, the termination of the linear portion of the curve, the bias is not sufficient to prevent a flow of anode current. This current, passing through  $R_2$ , produces a voltage change which is fed back to the grid, thus further increasing the anode current. To enable the phase inversion to take place, various systems are used; for example, a transformer—which is used for the blocking oscillator.

A simple blocking oscillator circuit is given at Fig. 35b. The charging com-

ponents are  $R_2/C_1$ , the former sometimes being made variable to control the rate of discharge. In this circuit, using a tetrode valve, the impedance ( $R_2$  in Fig. 35a) has been eliminated and the sync pulses are fed to the screen-grid. Triodes are frequently used in practice, but in each case the principle is similar. In the circuit shown, the feed-back is obtained by the loop formed by the closely-coupled transformer windings, the anode current being pulsed by the screen grid-control grid-cathode circuit.

When the anode potential is applied,  $C_4$  becomes charged and, at a critical value, starts to discharge. The grid, which has been biased well beyond cut-off, begins to lose its charge through  $R_1$ ,

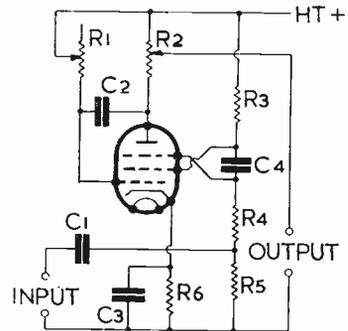


Fig. 37. The circuit known as the Transistron-Miller Integrator, derived from Fig. 36.

and when the bias is reached normal cut-off value anode current begins to flow. In so doing, a voltage is fed back to the grid inductively in opposite phase, thus driving the grid positive until full conduction is reached—at which point the condenser  $C_4$  will discharge. As this condenser discharges, the anode voltage automatically drops and the voltage induced into the grid winding of the transformer drives the grid negative—in fact, beyond cut-off—and so the whole process is repeated. The frequency of sawtooth output is determined by  $R_1/C_2$ , the former being made variable to act as frequency control.

### The Multivibrator

If, instead of a transformer, another valve is used to effect the inversion, a time base generator termed the Multivibrator is obtained; a typical circuit is shown in Fig. 35c. By using a twin-

triode, the two necessary valves can be accommodated in the same envelope. Incidentally, such valves are sometimes used for blocking oscillators—one section for the line oscillator and the other for the frame oscillator.

The Multivibrator is a form of relaxation oscillator and derives its name because of the fact that the output obtained possesses extremely sharp vertical edges and so is rich in harmonics. The action is comparable to push-pull, but each section is back-coupled to the other, the feedback paths being R<sub>2</sub>, C<sub>2</sub> and R<sub>3</sub>/cathode circuit. Some systems use two C/R combinations, but the circuit shown is of the cathode coupled type, in which the second path makes use of the common cathode circuit.

The actual operation is of a cumulative nature; by making grid 2 more positive, its anode potential will drop, thus driving the grid 1 further negative. This has the effect of causing the anode 1 potential to rise, thus increasing the change at grid 2. The heavy current then flowing in grid 2 has the effect of driving grid 1 well beyond cut-off. At this stage, V<sub>2</sub> is passing heavy anode current and continues to do so until V<sub>1</sub> begins to conduct again.

### The Transitron

Fig. 36 shows another form of hard valve generator, the Transitron. Like the Multivibrator, the action is cumulative. The suppressor grid is given a heavy negative bias and, under these conditions, the whole space charge is collected by the screen-grid and the valve is virtually non-conductive. By reducing the suppressor bias (on the arrival of the sync pulses) this effect is reduced, and thus anode current begins to flow. At the same time, of course, the screen-grid current falls and the voltage increases, so that if the suppressor and screen-grids are coupled (as by C<sub>2</sub>) the process becomes cumulative, and is, in fact, almost exactly similar to that obtained in the Multivibrator system.

A variation on this basic form of generator which is very popular is the transitron-cum-Miller integrator, the circuit of a typical arrangement being given at Fig. 37. The operation, expressed briefly, is as follows:—

Assuming that the condenser C<sub>2</sub> is charged to the full anode potential, the suppressor grid is at approximately cathode potential and the screen-grid and anode are both drawing current; thus, they are below the full applied

voltage. The voltage drop across R<sub>2</sub> means that no grid current will flow, in view of the fact that the grid is negative to cathode to this amount.

When C<sub>2</sub> discharges, through R<sub>1</sub> and R<sub>2</sub>, the voltage across it falls, and the grid is driven in a positive direction so that anode and screen grid currents will rise and the potentials fall. When the anode voltage falls below the value needed to attract the electron stream from the screen-grid, the anode current falls and the screen-grid current rises, causing this electrode to become negative because of the considerably increased voltage drop in R<sub>3</sub>. Owing to the coupling between the screen and suppressor grids (*via* C<sub>4</sub>), the latter is also negatively changed, and the effect is again cumulative until the stage is reached where cut-off occurs and no anode current flows.

When C<sub>2</sub> has discharged through R<sub>4</sub>/R<sub>5</sub>, C<sub>2</sub> begins to charge again, and so the whole process recommences. In the circuit shown, R<sub>1</sub> functions as the frequency control and R<sub>2</sub> as the amplitude (width or height) control. The period for which the anode current is not flowing is determined mainly by the time constant of C<sub>4</sub>/R<sub>4</sub>/R<sub>5</sub> and, as in other similar circuits, by the grid base of the generator valve used.

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### THE TOP BAND CLUB CONTEST

Many of our readers will have been listening on Top Band during the period of the *Short Wave Magazine* Fifth Annual 1.7 mc Club Transmitting Contest—or "MCC," as it is generally known. This year, activity was higher than ever before, with more Clubs taking part, more stations on the air to work the Clubs, and at 36 a larger final entry than we have had for any previous MCC event; in 1949, 25 Club sent in scores. The results of the 1950 MCC will be fully reported in the next (January) issue of our *Short Wave Magazine*.

### STILL AVAILABLE

We can still supply our *DX Operating Manual* (2s. 8d.); full-colour wall mounting *DX Zone Map* (6s.); *Principles of Short Wave Reception* (1s. 8d.); and *Country List by Prefixes* (6d.). All prices are post free and orders with remittance should be addressed to the Circulation Manager, *Short Wave Magazine*, Ltd., 53 Victoria Street, London, S.W.1.

# Have you heard?

THE general opinion seems to be expressed very well by one correspondent who says "What a lean month!" Certainly November had very little fat on it, from the DX man's point of view, especially if he stuck to the somewhat hackneyed 14 mc band. Surprisingly enough, the 28 mc band behaved much better and *did* produce quite a good selection of Things Worth Hearing.

The Calls Heard cover two lots of SLP's—two at the end of October, too late to come into last month's lists, and two at the end of November. Nothing startling is reported by anyone during any of these periods, but it is worth recording that the 28 mc affair (October 29, 1500-1600 GMT) produced phone from CE, CR6, CX, KP4, LU, MD2, OQ, PY, ST, VY2, ZD4, ZE, ZS and 4X. Fourteen DX countries going strong, even in bad conditions and on the band that suffers most!

The two periods on November 25 and 26 produced very little good stuff, although it was nice to see a few people taking an interest in 7 mc CW. But even their combined efforts did not add up to anything very noteworthy.

## The DX on 28 mc

Let us deal first with this extraordinary band, condemned as "dead" by so many, while their next-door neighbours pull in the DX! There are quite a powerful lot of Calls Heard lists covering Ten for the month of November, and I have been through them all and extracted the DX prefixes contained therein: AP, AR8, CE, CO, CP, CR4, CR6, CR7, CT2, CX, EA8, EL, EP, FF, HC, HH, HI, HK, HP, HZ, KG4, KG6, KP4, KS4, KV4, KZ5, LU, MD2, MI3, MP4, OQ, PK3, PK4, PY, PZ1, ST, TA, TG, TI, VK, VP2, VP3, VP5, VP6, VQ2, VQ3, VQ4, VS6, VS7, VS9, VU, W6, XE, XZ, YV, ZC4, ZC6, ZD1,

ZD4, ZE2, ZL, ZP, ZS3 and ZS7. And that should shake some of you!

There are sixty-four countries there—more than many listeners have heard on 28 mc during the whole year—and *all* heard by someone or other *during* November. I am almost inclined to say that anyone really concentrating on the band and adding all the Europeans heard during short-skip openings could have logged 100 countries during the month. It's wonderful what you *can* do by concentrating on one band.

So now let us see what individual listeners have to offer on ten metres. T. Ward (Ilminster) mentions CE2CC, CR7IV, HK4CO, KP4NQ, TI2PG and YV8AL, mostly heard at the beginning of the month. H. M. Graham (Harefield) was one of the lucky ones who logged ZS7C—at 1425 on November 26. He, of course, is in Swaziland and no mean rarity. H.M.G. found the best times for Ten were usually between 1440 and 1640, and then most of the signals heard were from Central America, Africa and the Middle East. He adds that the sure sign that the band is dead is given by TA3GVU leaving it in favour of Twenty!

N. S. Beckett (Lowestoft) says Ten has been "very disappointing," but nevertheless adds seven new countries for his Four Band Table. D. G. Martin (Cheltenham) also found it patchy, but mentions that he heard a VK in October; November gave him PK4DA for his 150th country.

E. J. Logan (Hertford) found the band showed several promises of opening, but was usually dead again within an hour. His Calls Heard list, however, seems to be one of the best for the band this month. Two new ones for K. M. Parry (Sandwich) were VP2GG and CR7IV.

F. K. Earp (London, S.W.11) has returned to the fold after some months absence, and is limiting himself to the

## FOUR-BAND DX (STARTING JANUARY 1, 1950)

Listener	28 mc	14 mc	7 mc	3.5 mc	Total Countries	Total Score
	(1)	(2)	(3)	(4)	(5)	*
R. S. Stott (Upminster) ... ..	132	187	106	45	192	470
J. C. Beal (N. Wembley) ... ..	120	169	85	31	174	405
W. J. C. Pinnell (Sidcup) ... ..	112	156	80	25	167	373
D. W. Waddell (Hitchin) ... ..	114	154	75	23	172	266
N. S. Beckett (Lowestoft) ... ..	87	152	87	34	157	360
D. W. Bruce (Eltham) ... ..	121	156	38	22	158	337
P. H. Strudwick (London N.W.11) ... ..	125	146	28	27	164(P)	326
D. S. Kendall (Potters Bar) ... ..	116	127	35	29	146(P)	307
A. M. Norden (London N.W.11) ... ..	120	118	40	26	136(P)	304
R. A. Hawley (Goostrey) ... ..	101	137	47	18	153	303
L. Singletary (Oxford) ... ..	99	128	51	21	147	299
M. G. Whitaker (Halifax) ... ..	100	114	62	22	144	298
E. J. Logan (Hertford) ... ..	125	119	33	20	140(P)	297
J. P. Warren (W. Croydon) ... ..	105	127	30	20	143(P)	282
A. Bannister (Manchester) ... ..	101	125	30	21	136(P)	277
K. M. Parry (Sandwich) ... ..	103	121	21	19	140(P)	264
S. A. Mann (Long Island, N.Y.) ... ..	113	137	10	3	149(P)	263
L. Corder (Hadleigh) ... ..	92	120	22	15	132(P)	249
T. Spencer (Slimbridge) ... ..	92	110	23	17	128(P)	242
L. Tombs (Swindon) ... ..	92	109	24	16	131(P)	242
E. J. Parish (Watford) ... ..	90	105	16	17	128(P)	228
H. M. Graham (Harefield) ... ..	74	109	25	17	125(P)	225
J. M. Graham (Glasgow) ... ..	85	74	32	25	112(P)	216
E. Trebilcock (Australia) ... ..	7	125	77	5	137	214
N. Roberts (Launceston) ... ..	60	110	20	20	116(P)	210
R. J. Line (Reading) ... ..	82	80	24	17	144(P)	203
P. Bysh (London, N.10) ... ..	67	81	27	18	132	193
D. E. Tomkinson (Brighton) ... ..	60	93	19	20	112	192
B. W. Sutton (Liverpool) ... ..	40	120	15	14	127(P)	189
K. Smeeton (Barnton) ... ..	40	99	37	13	110	189
E. A. Parkinson (Leeds) ... ..	73	79	16	14	99(P)	182
R. A. Fowler (Marlow) ... ..	59	73	28	16	106	176
F. Pilkington (Colwyn Bay) ... ..	35	99	24	14	104	172
D. G. Martin (Cheltenham) ... ..	61	70	24	15	98(P)	170
G. Murray (Newcastle) ... ..	57	75	16	18	96(P)	167
J. Cartwright (Letchworth) ... ..	56	81	14	16	98(P)	167
D. Cocking (Farnborough) ... ..	52	78	16	12	91(P)	158
F. M. Spence (S. Shields) ... ..	10	98	21	19	99	148
T. R. Lamble (Ardingly) ... ..	36	76	16	17	95(P)	145
F. A. Herridge (London S.W.12) ... ..	33	59	38	15	76(CW)	145
T. Ward (Ilminster) ... ..	40	77	14	13	96(P)	144
A. L. Higgins (Aberkenfig) ... ..	33	74	16	17	92(P)	140
A. O. Frearson (Birmingham) ... ..	48	58	19	12	81	137
G. Musk (Blackpool) ... ..	18	85	15	15	89(P)	133
A. R. Holland (Malvern) ... ..	29	74	10	6	86(P)	119
R. Gore (Yatesbury) ... ..	7	53	18	11	64	89
O. R. F. Mason (Prittlewell) ... ..	8	35	19	14	43(P)	76
D. E. Hayes (Hoddesdon) ... ..	25	13	3	4	28(P)	45

\* Sum of figures in Cols. 1, 2, 3 and 4



The Stand of the Short Wave Magazine, Ltd. at the Amateur Radio Exhibition, November 22-25, 1950, with members of our staff who were present on the opening day. A large number of SWL's and BSWL members visited the Stand during the Exhibition, and at different times the DX Scribe, A. A. Mawse, G6QB, G2XC and G3AKA were "available for consultation." In this photograph are, left to right: Austin Forsyth, G6FO (Editor), P. H. Falkner (Advertisement Manager) and Miss N. Clements (Secretary).

use of a portable all-dry 1-V-1 for 1951—just to see what DX he *can* achieve with it. So far, on ten-metre phone, it has brought in CR7, KS4AI, PK3JF, VS6AN, YU2GJ and XZ2SY—so it looks quite promising.

D. Pool (London, S.E.23) logged CR71V, VU2GJ and XE1KE—on a couple of Sunday afternoons. He thinks the band is livening up a little. D. K. Cocking (Farnborough) has found it "quite interesting," and lets his log speak for itself. It was he that raised the question of BBC transmissions in the band. They have now been identified by the announcement. "This is Wrotham testing." This, of course, deepens the mystery rather than solving it, as the two Wrotham transmissions are on 91.4 mc (FM) and 93.8 mc (AM). D.K.C. says that one of the signals is perfect and the other distorted, which seems to tie up with the two types of transmission.

For those who are interested but still

don't know about these transmissions, Wrotham Hill, Kent, is the site; the signals are omni-directional and are radiated Mondays to Fridays between 11 a.m. and 11 p.m., with a break between 4.30 p.m. and 6 p.m. The first session carries the Light Programme, and the second either the Home or the Third. Their range is considerable, so anyone with a converter covering 90 mc should have a good search.

J. P. Warren (West Croydon) found ten metres "tremendous" at the beginning of the month and poor at the end. He logged CP4DG, KS4AI, KV4AQ, ZP2AC and ZS7C—all nice ones—plus a W7 Maritime Mobile 600 miles NE of the Philippines. D. L. McLean (Yeovil) confirms this variation in conditions and says the band was almost dead after November 12. Before that he heard some quite good DX.

A. M. Norden (London, N.W.11) thought things erratic, but logged PZ1WK, ZS3O, AP2N, VS7SV VS9AH,

PK3JF and MP4BAB. R. J. Line (Reading) now has a receiver at school with him; he remarks on the number of XE's on Ten, and says he heard four of them in half an hour.

M. G. Whitaker (Halifax) rolled in some good DX in the CQ DX Contest, including VK6WU and PK4DA, but he would like to find EA0AB, FD3RG, PJ5FN and KV4AQ, all of whom he has heard being called. K. Parvin (Thornton Heath) considers conditions well down on last year, but still has heard 71 countries on it since October 1. KV4AQ gave him a new one.

G. C. Allen (Thornton Heath) has sold his battery O-v-O and made a mains version thereof, which he likes a lot. He pulled in some nice DX on Ten, including VQ9AA, KS4AC and KS4AI, all during the CQ Contest.

And that seems to be the lot for Ten! What a band it is—and how the reports vary. Of course, it is very sadly down on last year (which was sadly down on the year before), but it is rather *more* interesting now than in the days when one only had to switch on to hear all the world. Or don't you think so?

### Twenty Metres

At least there are no two ways of thinking about Twenty. The DX chasers are so used to making this band their mainstay that when it goes bad on them there is a huge moan at once! And it really has been bad, most of the time. Stray pieces of nice DX, like VR2 and YJ, have made brief appearances, but in general the band has been either a smear of European QRM or just a soft sizzling sound. Let's see what the consumers say!

W. J. C. Pinnell (Sidcup) logged VK1PG on phone for a new country, and the first Zone 39 station heard this year. T. Ward (Ilminster) remarks on the particular conditions which bring the W's in at mid-day; this has happened quite often on the band. He has also heard the VK's about 0815 GMT. (In passing, I might mention that I have on several occasions heard VK's at 1130-1200, stronger than they were in the early morning).

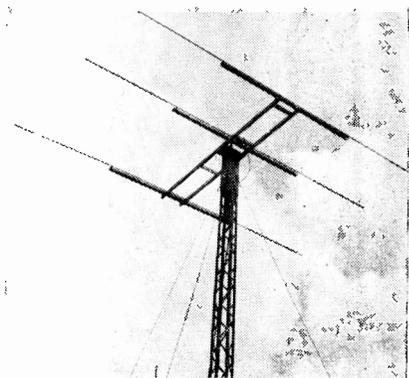
A. H. Edgar (Newcastle) was "off" for quite a time, and the first occasion on which he switched on brought him FB8ZZ on CW, followed by several KG6's. H. G. Graham comments on EL2X, who has been very active, the best of the others being VP6, VP9, CE3JJ, TF5TP and YL1CAG—all on phone.

For R. W. Finch (Ilford) things were very flat after about 1930, the only time he has been free to listen. N. S. Beckett has found 1600-1700 usually good, "with occasional flashes of brilliance." K. M. Parry mentions EL5A, VS2BD, NZ2SY, and VQ4's and ZS's. F. K. Earp singles out EQ3FM, JA2BL, CE2CC and UG6KAA.

D. K. Cocking logged nothing but ZS4AX and VE8GT; J. P. Warren didn't find much but W6 and 7 in the afternoon, with VE8 in the evening (plus JA2BL and EQ3FM); but R. J. Riding (Wednesbury) says signals from the North have been best, such as ON3BD and 3MW, TF5TP and VE8RD.

D. L. McLean seems to have done better than most; his best DX has been CR6AJ, EA6AR and 6AT, JA2BL, YK1AA, YJ1AA, ZD1SS, ZD6JL, and a couple of mobiles—MD2JH/Airborne, and CN8EI in a car near Casablanca. On the other hand, A. M. Norden's description of the band is "absolutely awful"; he went all out on 7 mc, about which more later. I. S. Davies (London, N.13) gives the consistency prize to VP6FO.

M. G. Whitaker confirms the usual fade-out in the early evenings, and says the best phone signal has been the S9 plus transmission from EL2X. K. Parvin's best was EA0AB on phone, plus DU1AL, JA2BL, Y13EC1 and ZP7AD (all phone). He adds that the following are all reported to be on 14 mc phone: JA01J, KB6AO, KC6AVC, KG6CX/KX6, KM6AM, KS6AA, PK6CS, PK7HR, VK6RH and ZM6AK. When your mouths have stopped watering we will proceed. (over)



The 3-element 10-metre rotary beam at G6TF, Sheffield. This photograph is interesting in that it shows clearly how such a beam can be constructed and supported.

G. C. Allen's best were PK5AA and FB8ZZ; around 1900 he has heard ET9X, ZS3, FQ8, CR6, OA and CE7AA, plus the usual lots of ZS and VQ4. Lots of others mention 14 mc DX, but mostly consider that they have nothing worth reporting, so I won't expand on their remarks about the band. To sum it all up, it seems that 14 mc has not been as good as 28 mc this month, except, possibly for those who have been able to listen on weekday afternoons.

### The DX on Forty Metres

Interest in the much-maligned forty-metre band is on the upgrade, but isn't it hard work cracking that QRM? If you spend too long on the band your head begins to swim with the effort, and it isn't until you strike a good patch and emerge with a few small plums that the whole thing seems worth the trouble. Some of the hardened forty-fans have, however, done quite well, and I doff my hat to them.

Best ones from G. C. Allen's bag (all on his broadcast receiver) were VP8AJ and 8AL, HC, LU, W7, ZD4, FM, HK, CE, HZ, VP9, VS7, KV4 and KG4. Any broadcast receivers want to compete with this one for CW reception? G.C.A. and others also logged a type called AC4LP (heard at 2340 working YU's), about whose status as a phoney I have no doubt at all.

K. Parvin heard IT1CLO, PY7LH and YO3RI on phone; M. G. Whitaker heard 4X4CZ, CN8ET, an SM8 and some UA's on phone, as well as UP2AB and EA8BC for new ones on CW.

A. M. Norden found it the most interesting band (even for phone) and logged EA6, UO5, EK, CT3, EA8, HK, CN, LU, CO, CE, HZ and 4X. One of his best was CE6AX, towards the Southern end of Chile, some 7800 miles away. J. P. Warren also calls it the "band of the month," on the strength of lots of Central and South Americans, Africans and Middle East stations—again all on phone.

Incidentally, should any of the Phone-Only listeners be puzzled by the absence of North Americans on 7 mc, I had better make it clear that it is a CW-Only band in the U.S.A.

TI2FI and HK4AM, both phone, were collected by F. K. Earp's all-dry midget; N. S. Beckett's best catch was CE3BM (phone) and FM7WF (CW). A. H. Edgar looked over the band one morning and found W's and VK'S (including VK7BJ) plus CP5SI. Judging by the call, the latter is a phoney,

though. W. J. C. Pinnell has brought his all-time total for Forty over the hundred mark, thanks to AR8AB, HR1KZ, KH6MG, KS4AI, FM8AD and VP5BF.

And that's the news of Forty, the band that either breaks you or seduces you, as I heard one enthusiast say!

### Conditions on Eighty

The 3.5 mc band has been disappointing, as yet, although CW listeners know that the ZL's have been there practically every morning since July. Phone listeners don't find very much except the Americans late at night, plus Europeans and stations in the Near East. Let us see what *has* been heard.

N. S. Beckett says that static still spoils the early-morning W's, and he has heard little else except some of the less usual Europeans, such as UA3HS, YO6CA and YU3DML. D. G. Martin says the W's are there if you can get up early enough. W4IYC, he adds, seems a consistent worker on the band. D. K. Cocking says the W's are still worth hearing on phone, and asks if anyone has yet heard a W6, 7, 9 or Ø on the band. (As a matter of fact, one British amateur has *Worked All States* on 80-metre phone—and that doesn't just mean all districts!)

H. J. Hill (Whitley Bay) says there seem to be "thousands of CW stations, all over the band." The CW band is, of course, 3500-3600 kc, which gives them plenty of space; I have very seldom heard an amateur CW station above 3600. The whole band is on a shared basis with the Services and not exclusively amateur, so there is never any lack of Morse anywhere between 3500 and 4000 kc. A. M. Norden, too, complains of "high noise level and CW QRM." He logged six W's, three VE's, four FA's and VO1Y, all phone.

M. G. Whitaker mentions LX1JW on phone, who, I imagine, would give a lot of listeners a new country. K. Parvin has found some of what he calls the "less common countries," such as CT, OE, OH, SP and FA. Finally, G. C. Allen says there's not much to shout about, and he leaves J. L. Hall (Croydon) to take care of the band; unfortunately, friend J.L.H. has not reported this month, so I leave it at that.

### Top Band News

No epoch-making DX has yet been heard, but this is the time and place to remind you of the Transatlantic Tests being organised early in the New Year

by *Short Wave Magazine*. Here, briefly, are all the facts you need.

The Tests proper will take place between the hours of 0500 and 0800 GMT on January 14 and 28, February 11 and 25, and March 11—all Sunday mornings. There will also be two special trial periods between 2200 and 0200 GMT on the nights of January 20-21, and February 17-18.

The W and VE stations will be calling Europe at the hour and each ten minutes thereafter (that is, 0500-0505, 0510-0515, and so on) with the European stations calling them in the intervening periods.

The frequency to be used by the Americans and Canadians will be the band 1800-1825 kc, the Europeans (we hope) keeping clear of this slice and operating below 1800 kc.

This will be a chance for CW listeners on the Top Band to achieve something in the nature of a rare feat. Watch for further details next month.

G. C. Allen's O-V-O hasn't been in use long, but has already achieved 52 Counties and 11 Countries on the band.

He recently heard LA7KA and also UA3AKB; but I should say that the latter was phoney, since all three-letter calls in Russia are club calls and *begin* with a K. G.C.A. says he feels that this band is "really going to shake the troops this winter."

M. G. Whitaker would like to know the QTH of GM3EAM when he "went portable" on 1.7 mc on November 14. R. Iball (Worksop) comments on the *daylight* DX that the band has been producing. He has logged G's from well down South round about mid-day. Among the "routine DX" heard (that is to say, at the proper times) are GC, DL, OK1AJ, OK3HS and E19J. R.I. says that, with one solitary exception, he has had 100 per cent. replies to his receiving reports on this band. HB9CM confirmed and sent photos of the transceiver he has built.

Talking of daylight DX, DL2QM told me some time back that he was receiving literally dozens of G's at mid-day, most of them too busy working locals to listen to his own signals.

H. J. Hill has managed to improve

### "ZONES HEARD" LISTING (POST-WAR)

Listener	Zones	Coun-tries	Listener	Zones	Coun-tries
<b>PHONE and CW</b>			<b>PHONE ONLY</b>		
M. E. Bazley (Kidderminster) ...	40	229	P. H. Strudwick (Lon. N.W.11) ...	37	164
R. S. Stott (Upminster) ...	40	222	J. P. Warren (W. Croydon) ...	37	160
A. H. Edgar (Newcastle) ...	40	219	A. M. Norden (Lon., N.W.11) ...	37	155
E. Trebilcock (Victoria, Aust.) ...	40	216	J. C. Beal (N. Wembley) ...	37	154
D. W. Bruce (Eltham) ...	40	215	J. M. Graham (Glasgow) ...	37	154
O. A. Good (Oswestry) ...	40	212	K. M. Parry (Sandwich) ...	37	151
R. A. Hawley (Goostrey) ...	40	199	G. Moses (Crewe) ...	37	149
W. J. C. Pinnell (Sidcup) ...	40	194	R. J. Line (Reading) ...	37	144
D. W. Waddell (Hitchen) ...	40	194	E. J. Parish (Watford) ...	36	164
J. C. Beal (N. Wembley) ...	40	187	D. G. Martin (Cheltenham) ...	36	150
B. Davies (Beckenham) ...	40	171	C. S. Pollington (Chichester) ...	36	149
N. S. Beckett (Lowestoft) ...	39	185	R. A. Fowler (Marlow) ...	36	141
R. G. Goulding (Wrexham) ...	39	148	T. E. Botham (Walsall) ...	36	139
L. Singletary (Oxford) ...	38	177	B. W. Sutton (Liverpool) ...	36	128
F. A. Herridge (Lon. S.W.12) ...	37	156	L. B. Bailey (Stockton) ...	36	125
G. H. Coulter (Dover) ...	36	144	S. Mann (Long Island, N.Y.) ...	35	163
W. Neal (Birmingham) ...	36	131	H. M. Graham (Harefield) ...	35	147
C. J. Goddard (Coventry) ...	36	129	A. L. Higgins (Aberkenfig) ...	35	137
<b>PHONE ONLY</b>			P. Bysh (London, N.10) ...	35	132
E. J. Logan (Hertford) ...	40	201	H. F. Webster (Darlington) ...	35	129
D. W. Bruce (Eltham) ...	39	188	A. R. Holland (Malvern) ...	34	122
K. Parvin (Thornton Heath) ...	39	168	A. O. Frearson (Birmingham) ...	34	114
R. G. Poppi (Beckenham) ...	39	167	D. Cocking (Farnborough) ...	34	111
R. A. Hawley (Goostrey) ...	38	187	W. C. Askew (Melton Mowbray) ...	33	129
D. Kendall (Potters Bar) ...	38	170	N. Roberts (Lancunston) ...	33	116
L. Tombs (Swindon) ...	38	155	D. C. Stace (New Zealand) ...	33	116
M. G. Whitaker (Halifax) ...	38	151	G. Musk (Blackpool) ...	33	116
D. Vincent (Beckenham) ...	38	140	B. L. Steadman (Hawkhurst) ...	33	103
D. L. McLean (Yeovil) ...	37	178	T. R. Lamble (Ardingly) ...	33	94
O. A. Good (Oswestry) ...	37	173	G. Murray (Newcastle) ...	32	112
			O. R. F. Mason (Prittlewell) ...	32	82

his reception up here by erecting 248 feet of aerial! But he suffers from the proximity of Cullercoats Radio, just as some of us down South catch it from North Foreland and Niton.

F. A. Herridge (London, S.W.12) pulled in OZ1W for a new country, as well as sundry new counties, including GM3GAY (Banff). He has now logged 812 stations in 53 counties and 11 countries. The only English county missing is Rutland.

G. H. Coulter (Dover) heard HA5BK/1 during the MCC week. We are all waiting to know whether he is genuine! But he still can't wrinkle out a G.D. N. S. Beckett, also during MCC, managed to find OK1AWA and OK1OPL.

T. R. Lambie (Ardingly) has found the band in good shape, and when home, at Bosham, he uses the "paternal rig," G3EVW. L. Singletary (Oxford) thinks my recent remarks (to the effect that Jersey, Guernsey and so on count as separate countries) might be taken to imply that the Isle of Wight was in the same category. However you took the remarks, please note that is isn't! It counts as Hampshire.

Next year we shall have to have a "Counties" contest for the keen Top Band Types, but not a Marathon; rather will it be a "sprint," if you can use that word for anything lasting for a month.

### One from Overseas

In the course of a long letter, VS2CP (Kedah) says that he gets plenty of SWL reports and, unfortunately, most of them are useless. As he says, it is very difficult in any case for the keenest SWL to make his report as useful as that gleaned in a two-way contact, because of the time element. Much of the information which would help is required at the time of transmission, and not some weeks later.

But, he adds, if only SWL's would try to make their reports more interesting, they would receive more replies. Some of the good ones have even elicited an Air Mail reply from him. The number he receives, however, asking for a direct, or even an Air Mail reply, makes it financially impossible for him to comply, but he will always try to send a card if it can be done through a Bureau.

### Miscellany

C. J. Goddard tells disappointed listeners not to worry if QSL's don't

arrive at once—he has just received two from TA3FAS and OQ5CF for reports sent in August, 1948! L. Singletary is now "ex-RAF" and at Oxford instead of Bicester, which gives him more listening time. He remarks on the number of good Top Band signals from the district on Sunday mornings.

R. W. Finch (Ilford) has built a single-valver with an EF50, with coils for all bands; on it he finds that local 3.5 and 1.7 mc transmissions can be heard on the speaker! Concerning the Top Band, he suggests that it would be an excellent thing if radio operators of small vessels were allowed to call amateurs on this band, if they are in distress and fail to raise a reply from their allotted frequencies. It seems an excellent idea, but I imagine that the authorities would find it difficult to work.

J. W. Cave (Parkstone) says TA1AT is a perfectly genuine station in European Turkey, often on 28 mc with very low power. R. J. Line (aged 15½) would like to see a competition specially for the "under-18's"; I'll have to work one out on these lines.

### Queries

K. Parvin would like to know definitely whether VK1YM is on Macquarie or Heard Island. He also suggests that, as HV1A is now written off, perhaps we could de-bunk the various ZA stations? ZA2AA is believed to have been genuine, though.

Funny ones: AC4LP and C9AA, heard by B. Davies; 19PA, heard by J. P. Warren; and DPJCG, heard by me!

Other short queries: I. S. Davies wants to know whether Corsica, Sicily, Newfoundland and Labrador are all separate countries. The only one of that lot that counts is Corsica; Newfoundland/Labrador you can count as one if you heard them before April, 1949—otherwise it's Canada. Sicily *might* count later, but at present it's Italy. And, for R. J. Riding: Spanish Morocco (EA9) is quite different from Tangier (EK), and Vatican City *would* count as a separate one, but there has never been a genuine amateur transmission from there. This we are informed by the Director of Vatican City Radio.

### Contests

Don't forget to get ready for the Top Band Transatlantics in the New Year. The Four-Band Table, as a 1950 Marathon, will close with next month's entries, and nothing can now stop R. S.

Stott (Upminster) from being well at the head. He has put up a terrific performance all the year, and it's too late for anyone to get near him! From January onwards the Four Band Table will revert to a Post-War basis instead of covering 1950 only.

### Set Listening Periods

We haven't time for any this month, as your letters are already due in by the time you read this! We are asking you to do the impossible, but hoping that you read the date in last month's issue and have remembered it.

The next SLP's will be as follows:—

January 27, 1600-1700 GMT: 14 mc

Phone and CW

January 28, 0500-0800 GMT: 1.7 mc

CW (W and F only).

### CALLS HEARD REPORT FORMS

Readers interested in sending us calls-heard lists for publication, either in "Calls Heard" or "The VHF End," are reminded that we supply, free of charge, a suitable form which makes it easy for the originator, the printer and ourselves. Send a large stamped

And that just leaves me one short paragraph in which to wish you all a very Happy Christmas and a DX-laden New Year. I should like to thank all the "regulars" for their unflinching support for this feature; without their comments and suggestions it would indeed be a dull affair. May your DX prosper and your Rx never let you down!

Closing date, alas! is **December 22**. This is unavoidable because of the Christmas posts and the fact that we are due to appear earlier than usual in January. So scribble something right away and we'll all do our best.

Address it to DX Scribe, *Short Wave Listener and Television Review*, 53 Victoria Street, London, S.W.1. Until 1951, Good Hunting, 73 and BCNU.

addressed envelope, with a card marked "Calls Heard Report Forms" to our office address and a supply will be forwarded by return. Please *do not* slip in the request as a p.s. to a letter about some other subject, otherwise action will assuredly be delayed.

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# CALLS HEARD

## SET LISTENING PERIODS

14 mc

Oct. 28, 1800-1900 GMT

W. C. Askew, Burrough, Melton Mowbray, Leics.

PHONE: CN8BV, 8ET, 8EX, MD2F, 2PJ, OQ5DZ, PY1AQ, 2CK, 4AGZ, 7GP, VQ4RF, 4AI, YV5BZ, ZS6FS, 4X4BI, 4BN, 4CZ, 4RE. (Rx: Commander.)

N. S. Beckett, 194 Waveney Drive, Lowestoft.

CW: CR4AH, 7CR, EK1JR, OQ5JR, PY1DF, 6AW, 7AN, 7LU 7WS, VO6EP, YI3DYN, ZE2JN, 3JL, 3JP, 3JQ, ZS1CZ, 6AAB, 6ABK, 6BJ, 8MK. (Rx: Ham-bander.)

I. D. McDermaid, 23 Manilla Road, Clifton, Bristol 8.

CW: EK1JR, LB9EC, (M/M), OQ5JF, PY7LN, VQ4BY, 4H1P, YI3DYN, ZE3JL, 3JP, ZS6BJ, 6DO, 6WO, 3V8AN. (Rx: SX17)

28 mc

Oct. 29, 1500-1600 GMT

J. S. Neilson, Bulls Cross Farm Waltham Cross, Herts.

PHONE: CE3AB, CXCG, LU4DB, 5AD, 8CW, MD2GC, PY2AUG, (VQ2HW), ZE2KH, ZS6JW. (Rx: S.640.)

J. A. S. Watson, 14 Cophthorne Road, Croxley Green, Herts.

PHONE: CX1CG, LU4DD, 5AQ, 5CK, 8BF, 8CR, 8CW MD2GC, PY1GQ, 2AUC, 3QO, 3SP, VQ2HW, 2WP, ZE2KH. (Rx: 1-V-1.)

N. S. Beckett, 194 Waveney Drive, Lowestoft.

PHONE: CX1CG, LU3DL, 4BV, 4DD, 5AD, 6DF, 8CW, 8BN, MD2GC, 2PJ, OQ5DZ, PY2AUC, VQ2HW, 2WP, ZE2KH, ZS4F. (Rx: Ham-bander.)

J. R. Killeen, 101 Derby Road, Hinckley, Leicestershire.

PHONE: CE2CC, CX1CG, 2CN, LU3AX, 4DD, 4DX, 5AD, 5AQ, 5CK, 6ES, 7AF, 8BF, 8CW, 8DB, MD2GC, 2PJ, PY2AUC, 7GV, VQ2HW, 2WP, ZD4AB, ZS6DJ, 6JS, 6JW. (Rx: AR88D.)

R. J. Line, Grove House, Leighton Park, Reading.

PHONE: CX1CG, LU5AQ, 6AS, 7AF, 8CW, MD2PJ, PY2AUC, ZS2AM, VQ2HW, 2WP, ZE2KH, 5T1T, 6DJ, 6JW, 4X4CZ. (Rx: S.640.)

Please note the following simple rules for sending in lists of Calls Heard

28 & 14 mc: No Europeans.  
No USA except W6 & W7  
No VE except VE5, 6, 7 & 8.  
7 mc: No Europeans.

Arrange logs in the form given here, with (a) prefixes in alphabetical order, but not repeated; (b) numbers in numerical order and repeated as part of the call sign; (c) callsigns in alphabetical order. For example:—  
VK2GW, 3CP, 4UL, VP1AA, 6CDY, VQ3HJP, 4EJT, W6ENV, 7VY. Please underline each prefix, keep each list to one band, and, in short, make your lists exactly like those below, except that the more space you leave, the better.

W. C. Askew, Burrough, Melton Mowbray, Leics.

PHONE: CE3AE, CR6AV, CX1CG, LU4DD, 8CW, MD2GC, 2PJ, VQ2DR, 2HW, 2WP, ZD4AB, ZE2KH, ZS4F, 6CY, 6DJ, 6JW, 6RA. (Rx: Commander.)

M. G. Whitaker, Stile-House, Shelf, Nr. Halifax.

PHONE: CR6AV, CX1CG, LU3AX, 4BB, 4DD, 5AJ, 5AQ, 5DC, 6ES, 8CW, MD2AF, 2CJ, 2PJ, OQ5DZ, PY2AHS, 2AUC, VQ2HW, 2WP, ZD4AB, ZE2KH, 2JL, ZS1CR, 3G, 4F, 6DJ, 6JW. CW: CT3AB. (Rx: Ham-bander.)

W. J. C. Pinnell, 40 Melville Road, Sidcup, Kent.

PHONE: CX1CG, 3CN, KP4LU, LU4DD, 5AD, 5AQ, 5CD, 8BR, 8CW, 8DB, MD2GC, 2PJ, OQ5DZ, PY2AHS, 3QO, 3S1, VQ2HW, 2WP, ZD4AB, ZE2KH, ZS6DJ. (Rx: V55R and Converter.)

H. Froggatt, 28 Lea Street, New - Mills, Stockport, Cheshire.

PHONE: CX1CG, LU4DD, MD2PJ, 2GC, ST2TM, VQ2HW, 2WP, ZE2KH, ZS6DJ, 6JW, 4X4CZ. (Rx: S.358X.)

7 mc

Nov. 25, 2230-2330 GMT

H. Froggatt, 28 Lea Street, New - Mills, Stockport, Cheshire.

CW: CX1AX, EA6AF, FA9UO, KP4HU, LU6EJL, PY1PV, 2ACT, 2DV, 9RZ, W8HGW, 4X4CR. (Rx: S.358X.)

N. S. Beckett, 194 Waveney Drive, Lowestoft, Suffolk.

CW: EA6AF, FA8BG, 9UO, PY2DV, W8HGW, 4X4CR. (Rx: Ham-bander.)

W. J. C. Pinnell, 40 Melville Road, Sidcup, Kent.

CW: CX1AX, EA6AF, FA9RW, KP4HU, PY2ACT, 2DV, 4X4CR, (Rx: V55R.)

R. S. Stott, 44 Corbets Tey Road, Uppminster, Essex.

CW: CT3AF/MM, CX1AX, EA6AF, FA9UO, KP4HU, LU6EJ, 7BT, PY2ACT, 2DV, W8HZM, 4X4CR. (Rx: S.640.)

14 mc

Nov. 26, 0800-0900 GMT

R. A. Hawley, Torview, Brookfield Crescent, Goostrey, Cheshire.

PHONE: EA8BB, 9AI, JA3AH, TA3FAS, VK4RT, ZB2A. (Rx: S.504.)

R. J. Riding, Trewatha, Wednesfield, Staffs.

PHONE: EA9AI, TA3GVU, ZB2A. (Rx: 1-V-1.)

R. Cresswell, Wood's Lane, Cliddesden, Basingstoke, Hants.

PHONE: EA8BB, TA3GVU, ZB2A. (Rx: 1082.)

K. Parvin, 98 Winterbourne Road, Thornton Heath, Surrey.

PHONE: CN8BJ, EA8BB, 9AI, EK1CH, FA3WW, 8CC, 9ML, 9WC, LU4CN, MD2PJ, TA3GVU, 4X4BJ. (Rx: S.640.)

W. G. Gore, Yatesbury, Calne, Wilts.

PHONE: EH8BB, 9AI, FA3WW, 8CC, TA3GVU, ZB2A. (Rx: 9-Vaive Superhet.)

D. H. Swain, 4 Victoria Ave., Levenshulme, Manchester 19.

PHONE: EA9AI, TA3GVU, VK4RT, VQ5CE, ZB2A.

W. J. C. Pinnell, 40 Melville Road, Sidcup, Kent.

PHONE: EA8BB, 9AI, EK1CH, FA3WW, 3WX, 8CC, 9ML, 9WC, LU4CN, PY6DN, TA3GVU, ZB2A, ZL2JB, 4X4DJ. (Rx: V55R and Converter.)

L. M. Singletary, 80 Southmoor Road, Oxford.

PHONE: EA8BB, 9AI, EK1CH, FA3WW, 8CC, 9ML, PY6DN,

TA3GVU, ZB2A, 4X4BJ. (Rx: *Hambander.*)

E. H. Goldsmith, 34 Amoy St., Southampton.

PHONE : EA9AI, FA3WW, FA8CC, LU4CN, TA3GVU, ZL2JB. (Rx: *BC 348.*)

## GENERAL

### 28 mc

R. A. Hawley, Torview, Brookfield Crescent, Goostrey, Cheshire.

PHONE : CX4CS, FF8AH, HC1SA, HH2RT, KG4AK, KS4AI, KV4AQ, KZ5WA, OQ5IZ, PK3JF, PZ1WK, ST2AM, TI2EV, VP6SD, VQ2HW, VS9AH, W2PFL/MM, 3K1F/MM, 5AX1/MM 50TF/MM 6GRF/MM, ZC4XP, ZD1BB, 4AB. (Rx: *AR-88 and S.504.*)

I. S. Davies, 127 Hazelwood Lane, London, N.13.

PHONE : AR8AB, FF8AH, 8PG, HK4AM, KZ5CE, KP4MP, LU4BD, 5CK, PY7EZ, VP6JC, 6JK, 6KC, VQ2WD, 4RF, VS9AH YV4AM, ZD1BD, 4AB, ZE2KH, 3JT, ZS5JY, 6JW, 6NX, 6SC, 6TE. (Rx: *R.208.*)

E. J. Logan, Linten Cottage, Fanshawe St., Bengoe, Herts

PHONE : AP2N, CE1AH, CN8EJ, CR6IV, CX3AA, EA8AX, EL6A, FF8PG, HC1O, KP4LR, KV4AQ, LU5DBN, MD2GC, MI3GH, OQ5AO, PY7EZ, TA3GVU, VQ4RF, VS9AH, XE1DY, ZC61M, ZD4AX, ZE2KH, ZS3D. (Rx: *BC342/JRFU32.*)

K. Parvin, 98 Winterbourne Road, Thornton Heath, Surrey.

PHONE : CR7IV, CT2AE, EL6A, FF3CN, 8PG, HI6EC, KG6HR, KV4AQ, PZ1WK, ST2KR, TG9AS, VK5EM, VP2GG, 3CW, 5FR, VQ2DK, VS6AM, 7SV, XZ2EM, YV1BE, 4AM, ZC4XP, ZD1BD. (Rx: *S.640.*) (Oct 25 to Nov. 25).

N. Roberts, 14 Broad Street, Launceston, Cornwall.

PHONE : HC1KV, 10Y, 1SA, HK4AM, KP4BE, 4FP, 4HF, 4KC, 4LR, 4MQ, KS4AI, KV4AQ, LU7BH, PY7EE, SVOWM, TA3GVU, TI2Y, VO3X, VP2GI 5AR, W6YYP, YV4AM, ZS6QC, 6J, 6Z. (Rx: *SX28 A and S 750.*)

R. J. Line, Grove House, Leighton Park, Reading, Berks.

PHONE : CX1CG, 4CS, FF3CN, HC1OY, HK3CK, 4AM, LU4EZ, MI3GH, PK3JF, ST2KR, TG9AD, 9AS, TI2BY, VP5AR, 6SD, VQ2HW, XE1AC, 1PO, 1PY, YV4AM, ZB1AJX, ZS6PW. (Rx: *S.640.*)

H. M. Graham, 28 Park Lane, Harefield, Middlesex.

PHONE : AR8AB, CO2CE, CX4CS, HC2KM, MD2GC, MI3SC, PY7EZ, SVOWX,

TA3GVU, VP5AP, 5FR, VQ2WP, 3BVF, ZB1AJX, ZE1JE, 3JT, ZS1HY, 6TE, 6XT, 7C, 4X4CR. (Rx: *1-V-1.*)

D. L. McLean, 9 Cedar Grove, Yeovil, Somerset.

PHONE : AP2J, 2N, AR8AB, EL6A, FF3CN, 8AH, HH1HB, HZ1KE, IINMC/Mobile TA, KV4AQ, KZ5FL, M3ER, 3GH, 3SC, 3US, 3XX, MP4BAB, PK3JFT, G9AS, TI2HP, 2RC, VK5AS, VS7SV, 9AA, 9AH, VU2GJ, XE1PO, ZC4XP 6JM, 6UNJ, ZD1BD. (Rx: *SX28 and AR88.*)

J. W. Cave, 12 Hilda Road, Parkstone, Dorset.

PHONE : AP2N, CO2EH, HC2KN, HZ1KE, KG6HR, KP4LR, KS4AI, PK3JF, ST2AM, VK5EM, VP5FR, VS6AM, VU2GB, ZC4XP, ZS1HY. (Rx: *0-V-1.*)

D. K. Cocking, Old Meadow, Farnborough Park, Kent.

PHONE : HC1OY, KZ5CD, M13XF, SV0WS, VP6FO, VQ4RF, VS9AH, ZB1AJX, ZE2JL, 2KH, ZS61R. (Rx: *S.640.*)

H. Froggatt, 28 Lea Street, New - Mills, Stockport, Cheshire.

PHONE : AP2N, CR7IV, LU1EK, 4DD, MI3SC, 3XX, PY7EZ, SVOWM, ZS1SY, 2A, 6Z, 6TE, 6WW, 6TVF, CW : LU3EL, PY2DV, 2OE, (Rx: *S.358X.*)

F. L. Copping, 25 Newfield Rd., Marlow, Bucks.

PHONE : AP5A, CR6AV, 7IV, CX2CO, EL6A, FF3CN, HC1OY, KP4HF, 4HG, KS4AI, MI3GH, MP4BAB, PK1TH, 3JF, TI2RC, VQ2CX, VP5AR, VQ3BVF, VS9AA, 9AH, VU2JP, XE1PY, ZC4XP, ZD1BD, ZS7C. (Rx: *S.640 and AR88.*)

D. Pool, 8a Ebsworth Street, Forest Hill, S.E.23.

PHONE : CN8EH, CR7IV, LU8JV, MD2AF, PY5DI, TA1AT, 3GVU, VQ2HW, 4ERR, VU2GJ, XE1KE, ZC6UNJ, ZE2JK, ZS6B, 6NX, 6RA. (Rx: *Sky Champion.*)

J. P. Warren, 14 Francis Road, West Croydon.

PHONE : AP2N, CP4DG, CR4AC, 7AN, 7IV, FF8PG, HH1HB, 2W, HI6EC, HP1LA, KG4AK, KS4AI, KV4AQ, KZ5FL KP4DA, PZ1WK, VP2CG, 5AR, 5FR, VQ3BVF, VS6AM, VU2HF, XZ2EM, ZL3DS, ZP2AC, ZS7C. (Rx: *R.103 and RF.24.*)

F. K. Earp (London, S.W.11.)

PHONE : CO2CE, CR7IV, 1LV, KP4AQ, KS4AI, PK3JF, PY1FH, 2CK, 4RK, VK3SW, 4KG, 4KS, VU2GJ, VS6AN, 7SV, XZ2SY, YV1EB, 4AM, ZE1JG, 2KH, ZS5G, 5JY, 6BV, 6CY, 6JW. (Rx: *1-V-1.*)

K. M. Parry, 6 St. Barts Road, Sandwich, Kent.

AR8AB, CE2CC, CP4DG, CR7IV, CX2C1, 4CS, EP3SS, FF3CN,

HC1FS, HH2W, 2RP, KP4HF, 2KC, MP4BAB, PK1TH, 3JF, TI2PY, VP2GG, VP5FR, VS9AA, ZC4XD. (Rx: *RF24 into BC348.*)

### 14 mc

R. J. Line, Grove House, Leighton Park, Reading, Berks.

PHONE : CS3AA, CX1CG, EA6AR, 8AV, SAX, 8BB, EL2N, OQ5DZ, TF5TP, VP4TH, 6FO, 6FR, 9G, ZB2A. (Rx: *S.640.*)

D. W. Bruce, 39 Dunkery Road, Eltham, London, S.E.9.

CW : AP2Z, BM7X, HP2RB, KG6DI, 6FQ, 6HC, 6HG, KH6ES, KV4AA, 4AQ, KX6BA, KZ5CP, 5GD, 5GF, MD4AMV, OA4BG, OQ5AS, PK1RI, 4VD, SI1SS, VK6KE, VP5BD, 6CDI, 8AP, VY2AE, 3BNU, VS1AW, 1BJ, 6AC, 6BO, 7NG, 7PS, VU2GB, 2JP, 2LJ, XE1VA.

J. P. Colwill, Hay Common, Launceston, Cornwall.

PHONE : CE3JJ, CX3DL, EA8BB, FA3ZF, HI6EC, KG4AK, KP4HF, LUSDU, MD2JH, OQ5DL, PY4AG, 6BP, VE8RD, VK2QR, 2WG, 4WJ, VP6FO, 6FK, ZA1A, ZE2JK, ZS6FD, 6Q, 6S, 4X4AT, 4DB. (Rx: *Roberts PAD.*)

J. Riding, "Trewatha," Tibbersley, Wednesfield, Staffs.

PHONE : CN8BV, 8EX, EA8BA, 8BB, 9AI, EK1AD, 1SA, FA8CC, 8DE, MD2PJ, OX3BD, 3MW, PY6BP, 8RJ, TA3BVU, TF5TP, VE8RD, VO1DX, VP6FO, VQ4VL, W7DL, ZB2A, ZD1SS, ZS6Q, 4X4RE. (Rx: *Home Bull 1-V-1.*)

B. Davies, 73 Eden Road, Elmers End, Beckenham, Kent.

CW : AC4LP, AP2Z, C9AA, DU1WP, EQ3FM, 3P, ET6AC, UG6KAA, VK6RU, VS1AJ, 1DY, 2CP, 6AC, 6BN, 6BO, 7RG, VU2CV, 2DJ, 2JP, 2NG, 2ND, ZD6EF, ZS8MK. (Rx: *2640.*) (Oct. 27-Nov. 22).

K. Parvin, 98 Winterbourne Rd., Thornton Heath, Surrey.

PHONE : CE3JJ, DU1AL, EAQAB, EQ3FM, JA2BL, PJ5RX, TG9AR, VE8RD, STC, VS2BS, 2CU, 9AH, VU2ET, XZ2KN, 2SY, Y13CEU, YN4CB, ZC4XP, ZE1JX, ZP7AD. (Rx: *S.640.*) (Oct. 25-Nov. 25.)

W. G. Gore, Yatesbury, Calne, Wilts.

PHONE : EA6AR, 6AT, 8AX, 9AI, EK1AD, 1DI, 1HB, FA3JY, 3ZH, 8CC, 8DD, 8DE, MD2PJ, OX3BD, PY6BP, TA3GVU, TF5TP, UG6KAA, VESMP, VP9G, VQ4AQ, 4RF, W7DL, 7NKW, ZL2JB, ZS1BV. (Rx: *9 valve superhet.*)

I. S. Davies, 127 Hazelwood Lane, London, N.13.

PHONE : CE2CC, CT3AD, CX1CG, 2CL, 3CN, PY2HV, 6BP, 6WL, 7XC, TF5TP,

VK2WT, 4LN, VP4TH, 6FO, 6PC, 6SD, 9G, 9ZZ, VQ2WD, 4RF, YN4CB, ZD2DYM, ZS60Y, 4X4CZ. (Receiver: R.208). Oct. 28-Nov. 23).

**N. Roberts, 14 Broad Street, Launceston, Cornwall.**

PHONE: AR8AB, CE2CC, KP4AC, 4AZ, 4GI, 4HF, LU1CF, OX3BD, SV0WX, TA3GVU, TF5TP, VESMV, VK2PS, VO1DX, 2CM, VP6FO, 6FR, 6SD, 9G, VQ2HJ, 4RF, XZ2SY, YV5AB, ZC6UNJ, ZS6Q. (Rx: SX28 A and S750).

**R. G. Poppi, 274 Kent House Road, Beckenham, Kent.**

PHONE: HS1SS, JA2BL, KG6GD, PK1SH, 4DA, UN1AD, VK6AT, VS1AX, 1AX, 2BS, 2CU, 7BR, 7SV, VU2BN, 2DY, 2ET, 2LF, XZ2KN, 2SY, YB3CC. (Rx: 1-F-1).

**D. L. McLean, 9 Cedar Grove, Yeovil, Somerset.**

PHONE: CR6AJ, HZ1KE, JA2BL, KL7BV, 7YZ, M31X, OQ5DL, 5DZ, VE7VO, 8ML, SOP, 8RD, 8SQ, 8TC, 8WI, YJ1AA, YK1AA, ZC6UNJ, ZD1SS, 6JL, ZE2JF, 2JU, 2KR. (Rx: SX28 and J488).

**D. H. Swain, 4 Victoria Avenue, Manchester 19.**

PHONE: CS3AA, EA8BA, EA9AL, EK1SA, FA8DE, HK1LA, KC4AC, MD2FJ, 2JH, 2PJ, PY1RC, 6AI, 6OM, TA3GVU, VP1JO, 5BL, 6FO, 6FR, 9G, VQ5CE, ZB1BB, ZB2A, ZD1SS, ZL2RL, ZS1BV. (Rx: PCR2).

**W. G. D. Orsler, 9 Pembroke Road, Erith, Kent.**

PHONE: FA8HS, 9WU, MD2AW, OX3BD, 3MW, PY6PP, 7EZ, TA3AA, TF5TP, VESMC, VP6FO, 9G, VQ4RF, 4CRK, YS4NCB, 4X4AT, 4BD, 4BK, 4BO, ZS3RR, 5IO, 6Z. (Receiver: R.208 and R1155A).

**C. J. Goddard, Dovedale, Birmingham Rd., Warwick.**

PHONE: EA6AF, EK1BX, FL6CC, FA3GZ, MD2AD, 2PJ, TA3FAS, ZS5IQ, 4X4AD, 4CC, CH: CN8EX, EA6AM, EK1AO, HB1H, LK2U, LU5RB, MD2KS, SM8ALP/MM, SPIJF, TA3GVU, UA0GF, 1AL, 1TO, VP3VY, VK2GW, YQ3RF, YU3FL, ZB2A, ZC4XP, ZL3JT, 4X4DR. (Rx: AW12).

**K. Ranger, Rochester, Kent.**

PHONE: EA8AM, OQ5NK, PY6BP, VP6FO, VQ4RF, ZB2A, ZE2JE, 3JL, ZS4EF.

**T. R. Lamble, Lea House, Ardingly College, Sussex.**

PHONE: CE2CC, CN8EX, EA9AL, FA3VW, LU6OD, OQ5BZ, PY1AQ, 2CK, 4RJ, 7LA, TA3GVU, VP6FO, 6IC, 6SD, VQ4RF, YV5VZ. (Rx: R.103).

**R. W. Finch, 36, Bathurst Rd., Iford, Essex.**

PHONE: EA8AV, KP4DD, MD2AC, MT2FE, TF5TP, VP4TH, VP6BX, FO, SD, VP9G, CW: GE3AG, 4AD, CT3AA, CX6AD, EA8BD, KP4AZ, MR, MT, LU3DAO, 8EN, PJ5RE, PK1RI, VE5OC, VPSBL, VP8AO, AP, 9UU, VS1DC, W6KEK, KIP, LW, 7NPU, ZB1CH, ZL4KB, 4X4DF. (Rx: 3-F-2).

## 7 mc

**J. P. Warren, 14 Francis Road, West Croydon, Surrey.**

PHONE: GNS8T, EA6AP, EK1AD, FASBE, HZ1KE, PY2AF, 4AJ, XE1AC, 4X4CZ. (Rx: R103).

**N. S. Beckett, 194 Waveney Drive, Lowestoft.**

CW: CE2DY, CN8MZ, EA9AP, EK1AO, FM7WF, KP4HU, 4QZ, LU1AP, VESPH, ZB1AB, 1IF, ZD4AB, ZL2AGL, 2LB, ZS2A, 4X4BZ. PHONE: CE3BM. (Rx: Ham-band).

**D. S. Kendall, 40, Aberdale Gdns., Potters Bar, Middx.**

PHONE: CE3AX, CM2MH, 6FF, CN8ET, 8NZ, CO2DN, 2PA, 5RC, 6MC, 8AE, 8AV, 8SE, EA6AF, FA3DS, HZ1KE, PY1DE, 2AFP, 2BD, 4DG, 4RJ, SPSAB, YO3AG, 3RI, YV5AF, 4X4CZ. (Rx: National HRO).

**G. C. Allen, 24 Wiltshire Road, Thornton Heath, Surrey.**

PHONE: CX1AX, EA61F, FA9UO, KP4HU, PY2ACT, 2DV, UA3CY, 3KET, W4AEK, YU1CAF, 4X4CR. (Rx: 9 valve S/H). Nov. 25, 2230-2330.

**I. S. Davies, 127 Hazelwood Lane, London, N.13.**

PHONE: CT3AK, EA8AL, FASDS, SEV, PY1AL. (Rx: R.1155A). Oct. 28-Nov. 24.

**B. Davies, 73 Eden Road, Beckenham, Kent.**

CW: FM7WF, HK4DP, KP4HU, 4KD, 4UW, KV4AQ, 4AU, KZ5RG, PK4DA, PYSKZ, 8MG, VP4TAQ, 5BF, 8AJ, VS7NG, VU2BC. (Rx: 640).

**H. Froggatt, 28 Lea Street, New - Mills, Stockport, Cheshire.**

CW: EA9AP, FASRJ, 9HS, KP4KD, PY1CD, 5RZ, UQ2AK, W1BJP, 1BRK, 1RKB, 1OMI, 3BES, ZB11F. (Rx: S358X).

**D. L. McLean, 9 Cedar Grove, Yeovil, Somerset.**

PHONE: CN8ET, EA6AF, HZ1KE, PY1AFP, 2AFP, 4AJ, 4X4CZ. (Receiver: SX28).

**A. M. Norden, 9, Leaside Crescent, London, N.W.11.**

PHONE: CE6AX, CM8MF, CN8BV, 8ET, 8MZ, CO2KA, CT3AC, 3AK, 3AR, CX4AT, EA6AF, 6AR, 6AT, 8BC, EK1HB, FA3DS, 8BE, 8EV, HK4AM,

HZ1KE, LU4DJ, PY1ABY, 2ADT, 2AFK, 2AFP, 2AHP, 2AHM, 2AIL, 2AZ, 2BDV, 2BFI, 4AI, 4AME, 4APD, 4CG, 4DW, 4QC, 4X4CS, 4CZ. (Receiver: Eddystone S640).

## 3.5 mc

**K. M. Parry, 6 St. Barts Road, Sandwich, Kent.**

K4WSC, VE1AA, 1IE, 1YV, 1ZS, VO2BL, 4AM, W11M, 2MI, 2NJF, 3CUX, 4CPG, 4CPZ, 4CUX, 4HSO, 4JOC, 4OHV, 4OH, 4OYL. (Rx: Bc. 348).

**T. Ward, 45 Summervale, Ilminster, Somerset.**

PHONE: HC1JW, TF5TP, VE11E, W1ATE, 1EMF, 1QDM, 1RSE, 4CRI, 8VNG. (Rx: R.1155).

**D. K. Cocking, Old Meadow, Farnborough Park, Kent.**

PHONE: W1AT, 1JRW, 1OND, 1RFE, 2URS, 4CPG, 4CTG, 4DCQ, 4IVC. (Receiver: S.640).

**A. M. Norden, 9, Leaside Crescent, London, N.W.11.**

PHONE: FASBG, 8JO, 9WC, 9WU, VE1YV, 1ZS, VO1Y, W2ZGG, 4HFJ, 4MR, 4OYV. (Rx: S.640).

**K. Parvin, 98 Winterborne Rd., Thornton Heath, Surrey.**

PHONE: FASBG, 8CF, 8JO, W1ATE, 1JLW, 1KQJ, 1OND, 8UQS. (Rx: S.640).

## 1.7 mc

**F. A. Herridge, 95 Ramsden Road, Balham, London, S.W.12.**

PHONE: GM3DZB, 3OM, GW2BG, 8BW, CW: DL2CH, 2DV, 2QM, E19J, GC2FMV, 3FSN, GD3UB, G16WV, GM3EGW, 3EHI, 3GAY, 3HAM/P, 6RI, 8FM, GW3AZO, 3EOP, 3EFZ, 3FFE, 3FSF, 5BL, 8NP, OK1AWA, 1QT, 1VW, OZ1W. (Rx: Modified R.103A).

**A. O. Frearson, 66 Wheelwright Road, Erdington, Birmingham, 24.**

CW: G3AXN, 3CVB, 3GKQ, 3GXR, 4AU, 4BU, 5RZ, 5YV, 6GM, 8KP, 8TB, GM6RI, GW3ZV. (Rx: S.640).

**R. J. Riding, Trewatha, Tibbersley, Wednesfield, Staffs.**

PHONE: G2ADM, 2BON, 2FPR, 2OG, 3CLG, 3DGH, 3FOP, 4JB, 6OI, 6OJ/A, 6WF, 8SR. (Rx: 1-V-1).

**N. Roberts, 14, Broad Street, Launceston, Cornwall.**

PHONE: G2AQH, 2BFT, 2CUG, 2FPR, 3AFT, 3AMM, 3ECU, 3EHD, 3EKT, 3FMZ, 3FSZ, 3ZV, 5AU, 5FU, 6IO, GD3CZ, 3UB, GW2XZ. (Rx: SX 28 A and S.750).



PSE QSL

The operators listed below have informed us that they would like SWL reports on their transmissions, in accordance with the details given. All correct reports will be confirmed by QSL card. To maintain the usefulness of this section please make your reports as comprehensive as possible.

- CO8BF** P.O. Box 666, Santiago de Cuba, Oriente, Cuba. 7055 and 14395 kc phone and CW, 1800-2000 GMT.
- DL1CM** Feldstr.66.111, Kiel Germany.
- DL1CN** Feldstr.66.11, Kiel, Germany.
- DL4GQ** J. F. Edgerton, Golden Weg 6, Wiesbaden, Germany. 14.1-14.2 and 28.1-28.5 mc phone.
- DL4HA** A. F. N. Fritzlar, APO. 171, c/o P.M., N.Y.C., U.S.A. 3.5, 7, 14 and 28 mc phone and CW.
- DL4ZU** R. R. King, 7801 S.C.U., APO.169, c/o P.M. N.Y.C., U.S.A. 14222 and 14330 kc phone, 2200 GMT. Quality and modulation.
- DL6AA** Johannisstr. 38, Herford/Westf., Germany. 7, 14 and 14 mc CW, 1900 GMT and weekends.
- DL7BW** Wiesbadnerstr. 78, Berlin-Friedenau, Germany. Phone and CW, all bands.
- EA3GK** P.O. Box 1312, Barcelona, Spain. 14 and 28 mc phone, 1800-2200 GMT. Modulation.
- EA8BE** c/Eduardo 4, Las Palmas, Canary Islands. 7, 14 and 28 mc phone and CW, 1400-1600 GMT, and at 2200 GMT.
- F9CD** J. Roussel, Ave. de la Gare, Cavaillon, Vau France. 14 mc CW, 0700-0800, 1800-2000 GMT.
- G2FXA** 35 Kensington Road, Stockton-on-Tees, Co. Durham. 1900 kc CW; Tues, Thurs, and Sunday, 2200 GMT; Saturday, 2300 GMT. Copy code word beginning each slow-Morse transmission. Any suggestions for better QRG.
- G3BHI** Harriss Cottage, Hedgeley Lane, Beaconsfield, Bucks. 7025 kc CW, VFO: Tues., Thurs., Sat., 2130-2230 GMT; Sun. 1100-1300 GMT.
- G3BXI** 6 The Avenue, Wanstcad, Essex. 14242, 14320, 28484, 28680 kc phone, 1900-2330 GMT.
- GM3CFS** 41 Ormonde Avenue, Glasgow, S.4. 14 mc CW and phone, 1800-2300 GMT and weekends. Reports from Africa and Asia, not Europe.
- G3ETC** 130 Sough Road, Darcen, Lanes. 1820 kc CW and phone, 2100-2200 GMT, Sun. 0930-1200 GMT.
- G3GHZ** 52 Queens Road, Accrington, Lanes. 1.8-1.9 mc CW, 2000-2300 GMT.
- G3GUP** 136 Beacon Road, Chatham, Kent. 3.5, 7 and 14 mc CW, 1900-2359 GMT.
- G3GZA** 9 Novers Park Drive, Bristol, 4. 1.7, 3.5, 7 and 14 mc CW, evenings and weekends. Critical rpts. on keying, drift and note.
- G3HAN** M. Hare, Blechley Park Hostel, DWS Block F, Blechley, Bucks. 3.5, 7, 14 mc CW, 2200 GMT.
- G4XC** 48 Roberts Street, Grimsby, Lincs. Reports all transmissions. Stations calling G4XC.
- HCIRE** P.O. Box 85, Quito, Ecuador. 14 and 28 mc phone, 2300 GMT.
- HP1GD** P.O. Box 536, Panama, Rep. of Panama. 14140, 14160, 14362 and 14390 kc phone and CW, 2000-0300 GMT. Quality and modulation.
- I1NU** P.O. Box 92, Trieste, 7, 14 and 28 mc CW and phone, 0700-0800 and 2100-2359 GMT.
- K4WAR** Radio Club, Camp Gordon, Georgia, U.S.A. 1.7, 3.5, 4, 7, 14 and 28 mc phone and CW, 1330-0400 GMT.
- KG4AD** D. Dahl, Box 350, Navy 115, c/o F.P.O., N.Y.C., U.S.A. 7, 14 and 28 mc phone and CW, 2100-0040 GMT.
- LH2A** } Technical University, Trondheim, Norway.  
**LI2A** } Phone, all bands except 160 mc.
- OA4ED** P.O. Box 1138, Lima, Peru. 14020 and 14400 kc phone and CW, 0001-0600 GMT. Reports on modulation and stability.
- OH3NJ** L. Lappalainen, Riihimaki, Viesti R, Finland. Keying, stability, 14050 kc CW; modulation, 14260 kc phone: Mon. and Sat., 1800-2000 GMT.
- OH3OX** Radio Amateur Club, Nokia, Kerhola, Finland. 14252 kc phone, 1805-1817 GMT.
- OH50L** Pentti Kallio, Rovijoki, JP/J.R. 9, Finland. 14080-14100 kc CW; Tues. and Sat., 1800-2200 GMT. Keying, stability and tone.
- OK1SK** Na Petynce 133, Praha VIII, Czechoslovakia. 3.5 7, 14 and 28 mc CW, 1800-2000 GMT.
- ON4VN** rue Longue-Vie 34, Izelles-Brux, Belgium. 28 and 144.7 mc phone and CW, 1500-2300 GMT.
- OZ3JP** Kalagervej 18, Kobenhavn. S., Denmark.
- OZ7VB** Stenlandsvej 8, Kobenhavn. S., Denmark. 3.5 mc phone, 1800-2300 GMT.
- PA0TC** Nieuwstraat, Nyverdal, Netherlands 3.5 and 7 mc phone, 1200-1330 GMT.
- PY1ANR** Rua Sao Salvador 53, Rio de Janeiro, Brazil. 14 mc CW, 2000-0100 GMT. Quality.
- SM5APW** Stockholmsvaegen 13, Hasselby Vst, Stockholm, Sweden. 7 and 14 mc CW.
- VE4FXJ** 15 Elm Park, Milltown, New Brunswick, Canada. 3.5, 4, 7 and 14 mc phone and CW.
- VE6MN** 1040-13th Street North, Lethbridge, Alberta, Canada. 14 mc CW. 28 mc phone, 0200-0600 and 1200-1400 GMT.
- VE8OM** c/o 193 Worthing Road, Basingstoke, Hants. Reports on all transmissions.
- VO6BF** C. Wardle, D.O.T., Goose Bay, Labrador. Quality of 3.5, 7 and 14 mc phone and CW.
- VU2BA** Surendra Singh Majithia, P.O. Sardarnagar, Dist. Gorakhpur, (U.P.), India. 7 and 14 mc phone, 1700-1900 GMT.
- VU2MQ** 1182 Bhaav's Pole, Raipur, Ahmedabad, India. 28160, 28448, 28544 kc phone, 0800-1000 GMT.
- W1BGJ** 166 N. Main Street, Southington, Conn., U.S.A. 7020 kc CW, 14265 kc phone, 1100-1200 and 2330-0130 GMT. Comparative reports.
- W1MD** 65 Pleasant Street, Hingham, Mass., U.S.A. 7 mc CW, 0040-0600 and 2300-2330 GMT.
- W3NOH** 4411 Wayne Avenue, Philadelphia, Pa., U.S.A. 14 and 28 mc phone and CW, 2200-0200 GMT.
- W4FXT** 27 Pine Crest Road, Birmingham, Ala., U.S.A. 14231 kc phone, 0901 GMT.
- W4RXO** 4 Oak Street, Isle of Palms, S.C., U.S.A. 14 mc phone, 1100-1300 and 2000-0300 GMT.
- W5RIQ** Box 705, Barksdale, A.F.B., Shreveport, La., U.S.A. 7, 14 and 28 mc phone and CW, 1600-0800 GMT. Modulation, band-width, QRG.
- W8ED** 19284 Riverside Drive, Birmingham, Mich., U.S.A. 7290 and 14020 kc CW, 0300-0500 GMT.
- W9CND** 710 E. 58th Street, Indianapolis, Ind., U.S.A. 14 mc CW, weekends 2100-0400 GMT.
- W9MWD** 2366 N. 5th Street, Milwaukee, Wis., U.S.A. Rpts. on signal strength, 14206 kc phone.
- YK1AA** P.O. Box 35, Damascus, Syria. 14 and 28 mc phone, 0300-1200, 1500-1730, 1900-2359 GMT.
- ZS6AG** P.O. Box 1364, Pretoria, S. Africa. 3.5, 7, 14 and 28 mc CW and phone, 1700-1900 GMT.
- ZS6DZ** 8 Schuller Street, Forest Hill, Johannesburg, S. Africa. 14005, 14026, 14044 kc and 50 mc CW, Saturdays 1700-2100 GMT.
- ZS6VH** 13 Contact Street, Wentworth Park, Krugersdorp, Transvaal, S. Africa. 14 and 28 mc CW. Reports after 1900 GMT only.
- ZS6WJ** F. Dunkley, 13 V.F.P. Voreniging, S. Africa. 14 mc phone and CW. VFO.
- 9S4AR** Scheffelsstr. 39, Saarbrücken, Saarland. 7 and 14 mc CW and QRP FM phone, 1700 GMT.

# THE VHF END

by A. A. MAWSE

## Receiving Contest Results—

### Gear Used and

### Station Reports—

### Call Heard and The Tables—

ONCE again a disappointingly small entry has to be recorded for this year's VHF Receiving Contest. It is made even more disappointing to your conductor by the promises of support given by many readers prior to the event, by the numerous requests for such a contest which have been made during the past months, and the resounding success of the *Short Wave Magazine* transmitting event, for which something like 100 entries have been sent in. Inability to read CW on the part of so many of our SWL's and the graduation of some of our more experienced listeners to transmitter's status are no doubt among the causes. It is also obvious that some listeners failed to send in an entry, as they thought their scores were not good enough! To those to whom this last comment may apply, your conductor would suggest that to have received *anything* on two metres is an achievement and one need not be ashamed of even a single-figure score.

The Contest week-end produced varying conditions. Throughout Saturday, November 11, from the start at 1200 GMT, conditions are reported by almost everyone to have been reasonably good. G5BY (Bolt Tail) was putting a consistent signal into the London area at 150 to 200 miles. G2CPL (Lowestoft) was audible 170 miles away on the South Coast, and numerous over-100 mile contacts were heard. On Sunday, with a marked deterioration in the weather, DX was mainly conspicuous by its absence, although there were occasional breaks. In the South-East, transmitting activity was excellent, and some of the contestants in the Transmitting Contest reported hearing over 100 different

stations. According to G2XC, of *Short Wave Magazine*, who organised the transmitting event, more than 170 G stations were active on Two during the week-end—and, believe it or not, a score or so of PAO's participated as well, and worked into Belgium and Germany. This widespread activity provided an ideal opportunity for everyone to discover whether it is conditions or activity that prevents the reception of signals. If you could not hear signals from Southern England during any period of Saturday afternoon or evening, or, from about 0830 onwards on Sunday, then please do not say it was activity, which was, in fact, *excellent* throughout all that period.

### Rx Contest Report

Winner of the Receiving Contest by a very big margin is A. L. Mynett, of Wembley. A.L.M.'s successes on 70 cms are too well known to need repetition here; his name appears at the top of the two-metre DX table, and now comes this further fine achievement. Congratulations, A.L.M.! The converter used employs two RF stages. The first is a 6J6 in a push-pull circuit and neutralised, while the second has two 6AG5's in push-pull; the mixer is a further p/p stage using another 6J6; the local oscillator consists of a Clapp circuit working on 10 mc, followed by multipliers to 120 mc. This converter feeds into an IF unit which is a double super-het in itself, the three frequencies involved being 26.5, 4.92 and 0.465 mc, with the local oscillators crystal con-

### VHF RECEIVING CONTEST

November 11 & 12, 1950

COMPETITOR	LOCATION	POINTS
A. L. Mynett	Wembley	248
M. M. Wallace	West Norwood	83
R. Hastie	Hayes	66
P. Flinn	Iver	52
R. L. Bastin	Coventry	27

trolled. The aerial system is two very wide-spaced Yagis, each of three elements, stacked 35 feet above ground and fed with 300-ohm tubular line. The location is 100 feet a.s.l. A.L.M.'s best distances during the Contest were the 181 miles to G5BY, whom he heard working G3BHS at 1305 on the Saturday afternoon; 161 miles to G201 (Eccles) heard working G2AJ on Saturday evening, and 150 miles to GW2ADZ (Llanymynech) heard working G3BOB. He also received G3AUS (Torquay) calling CQ. In all, he logged 110 stations. His final comment is: "I think conditions were easily good enough to put stations outside large centres of activity at the top of the lists."

Runner-up, M. M. Wallace (West Norwood) is a newcomer to this column and is second operator at G3ST. He has been listening on Two for about a month and uses a converter with 6J6 p/p RF stage, followed by a 6J6 cathode coupled RF amplifier into a 6J6 p/p mixer; the oscillator is another 6J6 in a push-pull circuit. A 6AG5 head IF amplifier feeds into an HRO-MX at 2 mc. The aerial used with this outfit was a "City Slicker" 15 feet high, firing North-East and South-West. A second receiving line-up was simultaneously available and consisted of a converted RF27, using 6J6's, feeding into an Eddystone 640 on 8 mc. The aerial for this was a 4-element wide-spaced rotary beam indoors and 32 feet high. Best DX for M.M.W. was G5BY, but due to non-reception of all the

details only reduced points could be claimed. GW2ADZ was also logged. In all, M.M.W. heard 54 stations.

R. Hastie (Hayes) used an Eddystone two-metre converter into an AR88LF, with an RF27 into BC455 as a standby. A 4-over-4 fed with 300-ohm line and rotatable at 26 feet was erected specially for the Contest. In fact, it was not up until 1845, and so made R.H. late in starting. However, he says it was all good fun and a very pleasant week-end. His log appears to be mainly stations working on phone and includes 53 different calls, which is excellent going. G3WW (March) is his best DX.

P. Finn (Iver) says his list is only a check log, but as he had added up his points and heard as many as 48 stations we have included him among the contestants and hope it will be in order. (If not, apologies to P.F.) The receiving line-up used two EF54's and a CV6 into a BC348 at 5.7 mc. A 6-element stacked array at 30 feet was the aerial system. R. L. Bastin (Coventry) was only able to spend two and a quarter hours listening during the week-end, and his score of 27 points is therefore commendable. His best DX heard was G3BLP (Selsdon) at 110 miles, and in all he logged 16 stations.

Receivers used by R.L.B. were a G2IQ converter and an RF27 modified and with a 955 oscillator; these feed into a BC342N at 8 mc. Two *Short Wave Listener* type very wide-spaced 4-element beams were available, these being in the roof space, one pointing

## VHF CALLS HEARD

### Seventy Centimetres

**A. L. Mynett, 29 Sunleigh Road, Alperton, Wembley, Middx.**

**0-50 miles:** G2ANT, 2CIW, 2DD, 2FKZ, 3FP, 4CG, 5PY, 5TP, 6NB, 8KZ, 8SM.

**50-100 miles:** G2XC.

**100-200 miles:** G5BY.

(446.4 converter, 16-ele stacked collinear array at 30 ft.).

### Two Metres

**W. C. Askew, Burrough, Melton Mowbray, Leics.**

G2AIQ, 2ATK, 2BWW, 2FNW, 2HCG, 2IQ, 2RI, 2XS, 3APY, 3BA, 3BK, 3BLP, 3DEP, 3DUP, 3EMJ, 3ENS, 3FOD, 3FXG, 3WW, 4NB, 5LK, 5RW, 5TP, 6CW, 6NB, 6VX, 6XM 8UZ. (October 23 to November 26; G2IQ converter into "Commander"; 4-ele beam 33 feet high).

**E. A. Lomax, 28 Welbeck Road, Bolton, Lancs.**

*Berks:* G5RP, *Bucks:* G6NB, *Camb:* G2AIQ, 3WW, 4MW, *Cheshire:* G3ATZ, 3AYT, 3BOC, 3CMX, 3FMI, 4OS, 5CP, *Cumb:* G3BW, *Devon:* G5BY, *Derby:* G3EMJ, 3PY, 5RW, *Flint:* G3WDBN, *Glos:* G5BM, *Hants:* G6XM, *Herts:* G6LL, *Kent:* G2AJ, 6VX, *Lancs:* G2HGK, 201, 3AGS, 3A00, 3BPJ, 3CSC, 3DA, 3ELT, 5VN/A, 6LC, 6QI, 8SB, *Leics:* G3ENS, *Midd:* G4HT, *Mont:* GW2ADZ, *Northants:* G3BA, 3DUP, *Notts:* G2XS, 3APY, 6CW, *Oxon:* G5TP, *Salop:* G4LU, *Staffs:* G3CXD, *Surrey:* G3BLP, 4CI, 5MA, *Somerset:* G3EHY, *Warw:* G3ABA, *Wilts:* G3DEF, *Wores:* G3BHE, *Yorks:* G2IQ.

**L. B. Bailey, 16 Fulthorpe Road, Norton, Stockton-on-Tees, Co. Durham.**

**0-50 miles:** G2ADR, 2FO,

2FXA, 2DMK, 3EHZ, 5QU, 8GL.

**50-100 miles:** G6PJ.

(RF27 into Eddystone 640, 3-ele c.s. beam 15 ft. high).

**A. L. Mynett, 29 Sunleigh Road, Alperton, Wembley, Middx.**

*PHONE and CW:* **50-100 miles:** G2AIQ, 2AOK/A, 2ATK, 2AVR, 2FNW, 2UQ, 2XC, 2XS, 2XY, 3ABA, 3ABH, 3AEP, 3AKU, 3ARL, 3AVO/A, 3BA, 3BEX, 3BHS, 3BK, 3DAH, 3DEP, 3DIV/A, 3EBW, 3ENS, 3FAN, 3WW, 4MW, 4NB, 5JU, 5UD, 8DM/A, 8IL, 8LY, 8QY, 8SY, **100-150 miles:** G2CPL, 2DLJ/A, 2IQ, 3APY, 3EHY, 3VM, 3YH, 5BD, 5UF, 6CW, 8UZ.

**150-200 miles:** F8GH, G2OI, 3AUS, 3CQC, 5BY, 6YO, GW2ADZ.

**200-250 miles:** F8OL. (Rx: 6J6 Converter. Aerial: Two 3 ele. very widely spaced Yagis, stacked at 35 ft. October 15-November 12).

North and one South, while a "City Slicker" outside the house was used for East and West working. R.L.B. regretted that many of the transmitters failed to repeat reference numbers and RST, with the result that they were often lost in fading. He asks for 12-hour contests in future and for at least two each year!

In several cases the scores given in the accompanying Table of Results are different from those claimed by the competitors themselves. Our assurance can be given that these changes have only been made after very careful checking against the Transmitting Contest entries and accurate measurement on the Ordnance Survey "Ten-Mile" Map. Whenever there was any doubt, no alteration has been made to competitors' claims. It is, of course, in the interests of all that the scores should be as accurate as possible.

### Other News

P. J. Towgood (Bournemouth) writes to regret his inability to take part in the Contest due to a gremlin in his receiver. An intermittent electrode short in an EF50 was finally found to be the cause of the trouble. During the short periods he was able to listen he noticed severe fading on signals over 50 miles, and generally thought conditions poor. Some bother with the stability of the oscillator in the 1.4 mc converter has been traced to voltage fluctuations across the S130 stabiliser. He asks if anyone else has experienced this with the S130, as two new ones have both suffered from the same symptoms in his Rx.

L. B. Bailey (Stockton-on-Tees) envies the Southern listeners their 2-metre DX, and he would like to contact any other VHF listeners in his own district. A CV66 pre-amplifier is under construction, and also a 4-element beam. During the Contest period he listened for 10 hours but only heard three phone signals and some CW that was too weak to read; he is using an RF27 into an Eddystone 640. L.B.B. says he finds the RF27 an excellent converter. A. H. Edgar (Gosforth) reports that he is now ready for two metres and all he wants is a little activity on the band. G<sub>4</sub>LX has helped him get his RF26 going on the right frequency, after discovering that it was tuned to about 200 mc! Having experimented with a number of aeriels, he has built the *Short Wave Listener* beam, and although it is still in the

## TWO-METRE COUNTIES HEARD

### Starting Figure 10

E. A. Lomax (Bolton) ... ..	38
A. L. Mynett (Wembley) ... ..	} ... 36
P. J. Towgood (Bournemouth) ... ..	
R. Rew (Birmingham) ... ..	30
A. W. Blandford (Mitcham) ... ..	} ... 28
L. A. Whitmill (Harrow Weald) ... ..	
R. L. Bastin (Coventry) ... ..	24
W. C. Askew (Melton Mowbray) ... ..	19
P. Finn (Iver) ... ..	17

shack, it shows terrific gain over anything tried previously.

A. W. Blandford (Mitcham) logged 45 stations on phone during the Contest. (It seems a pity he did not send in an entry!) On 70 cm he has increased his score by one, having logged G8SM (Molesey). A. L. Mynett (Wembley) is now licensed as G<sub>3</sub>HBW and would welcome reports from listeners on his 434.5 mc transmissions. Since last month A.L.M. has logged G<sub>2</sub>NC twice again on 70 cm, the dates being October 21 and 25; in fact, it begins to look as if the path G<sub>2</sub>NC—G<sub>3</sub>HBW is open for weak signals most of the time. G<sub>5</sub>BY was also heard in Wembley on October 21, and G<sub>3</sub>HBW has now logged 19 70 cm stations in 8 counties.

R. Rew (Birmingham) is also licensed now, as G<sub>3</sub>HAZ, and is active on 70 cm on Sundays from 1000 to 2130—like G<sub>3</sub>HBW, he would be glad to have listeners' reports. Further north, E. A. Lomax (Bolton) was finding the two-metre band wide open on November 26 when he wrote his monthly report. He, once again, finds these good conditions coinciding with a high barometer and an east wind at his location. He was active during the Contest, which he thought 100% better than last year. (But no Contest entry has come to hand from E.A.L.!) He suggests that in the Calls Heard lists listeners should arrange the calls under counties, and put in his own list in that form. Although we are printing E.A.L.'s list this month, before you all start doing the same thing please give us time to consider the possible repercussions on the production side and the space involved; at the same time, if you have any views on the matter, please comment next month. In the meantime, may we once again stress the necessity of placing calls in *alphabetical*

and numerical order. Quite a number of lists have to be completely rearranged before they can be printed.

#### VHF Listeners' Club

The Fiveband Club are hoping to arrange a dinner for early March, to be held in London. Any members of the VHF Listeners' Club who would like to attend should communicate with us as soon as possible, and full details will be sent.

#### In Conclusion

Your conductor would like to wish all his readers a very happy Christmas and a prosperous New Year, with plenty of 144 and 420 mc DX. He is very grateful for the support accorded him during the past year and is confident of its continuance through 1951. Your reports for next month should reach A. A. Mawse, *Short Wave Listener and Television Review*, 53 Victoria Street, London, S.W.1, by **December 28**, latest.

## TV Questions and Answers

### DIM OUT

*Is there any method of cleaning the tube face that gives more lasting results than just occasionally mopping up with a duster (and which involves removing the protecting glass each time?)*

E. J. C. (Brentford)

The main reason for the heavy accumulation of dust particles on the glass face of the tube is the electrostatic charge which builds up. There is a proprietary preparation called "Sirosol," obtainable from many radio dealers, which will neutralise this electrostatic charge and thereby minimise dust settlement. The cream should be evenly applied on both the tube face and the inner surface of the protective glass. By the way, we have been told that "antidim" ointment, provided with war-time respirators, is an effective agent!

### ALUMINISED TUBES

*I am considering purchasing an aluminised tube, but would first like to hear your views concerning the claims that such tubes give a brighter picture and are not liable to develop ion burns.*

P. M. (London, N.7)

The various claims made for the aluminium-backed tube are quite justified. The main advantage is that an improvement in resolution is brought about (better contrast and brightness) in that it is possible to operate the tube

at a much lower beam current. The electron beam penetrates the thin film of aluminium, sprayed on the back of the fluorescent material, and energises the phosphor to produce illumination in the normal manner. However, the aluminium has the effect of preventing the illumination from being dispersed back into the bulb, and the action can be likened to a reflector—with consequent greater illumination efficiency.

Regarding ion burns, this trouble seldom occurs with aluminised tubes because the heavy ions, which remain in the tube even after evacuation and if allowed to impinge on the phosphor material bring about subsequent deterioration in the form of brown patches, do not penetrate the aluminium film to such an extent as the electron beam. Their presence on the fluorescent material is thereby greatly minimised and the risk of burns becomes remote.

It should be obvious, however, that in passing the aluminium backing, the electron beam is attenuated to some degree. This only occurs, fortunately, at low anode voltages. At potentials at and above some 5 kV the attenuation effect becomes less noticeable, and at even higher voltages a greater proportional brightness than with a normal tube is obtained.



### DX TV RECEPTION

Writing from Jersey, C.I., GC2AWT reports the reception of Sutton Coldfield at good programme value, with an excellent picture and sound at "full loud speaker strength." As time goes on, it will be interesting to see what DX is achieved by S.C., as the radiation efficiency is a good deal higher than A.P. and we already know that, under certain conditions, good DX is possible at frequencies around 60 mc.

## WORLD WIDE RECEPTION OF SHORT WAVE PROGRAMMES

**DX** *broadcast*

MONTHLY COMMENT BY R. H. GREENLAND, B.Sc.

**I**T is the custom at this time of the year for one to take stock of one's position and to make new resolutions for the future. These monthly notes are largely the result of the endeavours of our many correspondents, and may we be the first to thank them and to congratulate them on the high standard of the reports sent in; during the past four years there has been a remarkable improvement in general lay-out and detail. For the future, we would ask you to continue in the same way and, in particular, please try to ascertain the exact address to which transmission reports for any particular station have to be directed.

It was a pleasure to hear once again from one of our once very active reporters: Captain T. B. Williamson, now of Benghazi, Cyrenaica. Doc. Williamson in his present location had expected to be able to hear some of the rarer Africans, such as Beira, Mocammedes, Lobito and Hargeisa in the 7 mc band, but though amateur QRM is not so heavy as in the United Kingdom, there are sufficient Italian and French phone stations to make life miserable! Nevertheless, T.B.W. has some comparatively rare stations recorded in his log book.

A. W. Mann (Middlesbrough) agrees with the remarks made in our opening paragraph of the October-November number. He suggests that those who cannot erect a good horizontal aerial should try a tuned vertical one! On the subject of receivers, he remarks that the average regenerative two-valver and the three-valve TRF can pull in most of what is heard on the larger sets, and, in addition, much that is missed on the latter types through inherent and background noise.

R. A. Savill (Sevenoaks, Kent), has been busy constructing a more selective receiver, for, with the local station at Wrotham testing each evening, its

signals were breaking through all over the various short-wave bands on his old set.

Our U.S. correspondent, S. A. Mann (Westbury, Long Island), informs us that medium-waves are opening up for DX there. Between 0400 and 0700, he has logged BBC, Ottringham, Yorks., on 1295 kc, Toulouse 1 on 944 kc, and Monte Carlo, Monaco on 1466 kc, all with strong and consistent signals.

**Australasia**

Radio Australia's broadcasts, other than those directed to the United Kingdom, are often heard here. B. P. Middleton (Clapham, S.W.11) noted VLB4, 11850 kc, with boxing commentaries at 1205 on November 4. In the mornings he has heard VLB3, 11760 kc; in a letter addressed to him from Radio Australia recently are the words: "We are receiving many reports of jamming and interference."

We have often heard VLH3, 9580 kc, with News at 1300, followed at 1315 by "News for the Inland and the North-West." At 1320 there are station announcements for listeners to 3AR, 2CO, 2GI and 2WB, and short-wave stations VLI13 and VLG10. Before closing down at 1330 (1400 on Saturdays) it is stated that the National transmitters will return to the air the next morning at 6 o'clock over VLR2, 6150 kc, VLI14 and VLG11, 15210 kc.

VIQ3, Brisbane, 9660 kc, has likewise been a good signal with the same programme (except for Queensland State News at 1315) from 1300 to 1330. At 1320 you may hear the words: "You are listening to the Inter-State programme which is broadcast through 4QG."

On October 30, after the State News, there was Music for Strings at 1320, and at 1325, Evening Meditation was conducted by the Rev. W. R. Rhodes. Before the National Anthem at 1330,

## TABULATED SCHEDULES

## I. All-India Radio. Government of India, New Delhi.

English News in the External Service of All-India Radio, Delhi.

Time : GMT.	Duration. (Min.)	Frequencies.
0230	15	17760 kc, 11830 kc, 9680 kc, 9565 kc, 7275 kc, 7225 kc.
0415	15	17780 kc, 15160 kc.
0730	60	News etc. 21700 kc, 17780 kc.
0800	10	17760 kc, 15290 kc, 11830 kc.
1030	30	News etc. 17760 kc, 15160 kc.
1230	10	11760kc, 15290 kc, 11830 kc, 9680 kc.
1330	75	News etc. 17840 kc, 15350 kc.
1530	15	15160 kc, 11830 kc, 9680 kc, 7225 kc, 6010 kc.
1545	15	15130 kc, 11790 kc.
1900	60	News etc. 11760 kc, 9620 kc.
0030	15	17830 kc, 15160 kc.

## II. South African Broadcasting Corporation.

Daily schedules.

Programme A = English.

Programme B = Afrikaans.

- (1) Johannesburg A.  
7220 kc : 0445-0630, 1400-1630.  
9870 kc : 0815-1210.  
4800 kc : 1640-2105.
- (2) Johannesburg B.  
7270 kc : 0445-0630, 1400-1650.  
9520 kc : 0815-1210.  
4890 kc : 1700-2105.
- (3) Johannesburg C. (Commercial). Springbok Radio. English and Afrikaans.  
7290 kc : 0445-0645, 1400-1600.  
9600 kc : 0645-1400.  
4940 kc : 1600-2100.
- (4) Cape Town B.  
5890 kc : 0445-0630, 1700-2105.  
9610 kc : 0815-1210, 1400-1645.
- (5) Pietermaritzburg B.  
4878 kc : Same schedule as Cape Town B.
- (6) Salisbury, Southern Rhodesia A.  
7280 kc : 0900-1115.  
3320 kc :  
6018 kc : } 1500-2000.  
9490 kc : }

the announcer gave the key-station in the network at 4QG on 790 kc, with Regionals QA, QB, QY, QS, QN, QL and short-wave VLQ3, 9660 kc, and VLM, 4917.5 kc, as Relays. On November 16 at 1335, VLW5, Perth, Western Australia, 9610 kc, was logged with pianoforte music, and there were English announcements at 1400.

Many of us are gripped with the Test Match fever! The writer has heard other MCC matches as follows: Evans 80 and Dewes 94, batting versus Western Australia (VLB5, 21540 kc, at 0700, Saturday). Similarly, over the same station at the same time on November 11, Victor Richardson was heard as commentator when England were 49 for 0 in reply to the New South Wales total of 509 for 3 wickets declared. On November 18, at 0710, Dewes reached his 50 in the match against Northern Districts at Newcastle, New South Wales.

No definite pronouncements have as yet been made in the matter of Test Match relays, but we understand that

ball-by-ball descriptions will be given each day between 0150 and 0810, probably over 21680 kc and 17840 kc; try VLB5, 21540 kc, also. We would ask would-be listeners not to be too optimistic, for reception from Australia between midnight and 0700 is not normally good at this time of the year!

S. A. Mann informs us that FO8AA, 6980 kc, and FZP1, 12080 kc, both in Tahiti, and which operate daily in parallel from 0400 to 0500, are well heard in the United States. Both are situated at Papeete, the capital, the former being owned by Radio Club Océanien and the latter by the French Government.

## Asia

Capt. Williamson hears BEE7, Chungking, 11913 kc, with Chinese talks at 1430. R. A. Savill has received a letter verification from Radio Peking on 10260 kc (now 11685 kc); they write: "Please favour me with your reports about our broadcast very often," and the postal address is given as: Peking

Broadcasting Station, 3 Si<sup>4</sup>Chang-An Street, Peking, China. Nationalist stations are BED<sub>4</sub>, Taipeh, Formosa, 15235 kc, with schedule 0400-0600 (English: 0400-0500) daily, and BCSS, Taiwan (Formosa), 7331 kc, with the slogan: "The Voice of Righteousness."

Other active Far Eastern transmitters are: Seoul, Korea, 2510 kc; Hankow, 6645 kc; Mukden, 5914 kc; and Harbin, 7100 kc.

R. Dunkley (Waterlooville, Hants.) logged Radio Trinidad on 9625 kc, and on a slightly lower frequency heard an Eastern station opening up at 2300 with tuning note, March, announcement in an Oriental language, trumpet fanfare, and News (male and female readers). This could be a Japanese station, or is it of Russian origin? Your solutions, please!

Indo-China has come in for considerable comment of late, but there seems to be little doubt that it is still operating on 11780 kc and 9524 kc. J. C. Catch (South Shields) listened to FZS<sub>4</sub>, 11780 kc, from 1340 to 1420 on November 8, and heard Sinatra and Chevalier recordings, and at 1400 a female announcer with the words: "This is Radio France-Asie in Saigon operating on 11780 kc in the 25-metre band. Here is the News!" We logged Saigon between 2230 and 2255 on November 18 with another English transmission, this time on 9524 kc, and it is reported that this same broadcast is also carried over 6115 kc. Your address for reports is: Radio France-Asie, P.O. Box 412, Saigon, French Indo-China. The Voice of the Viet-Nam in Indo-China has different programmes on 9620 kc and 7263 kc, with English from 1415 to 1430, at which time it closes down.

Bangkok, Siam, is now using 15910 kc, 11910 kc and 6211 kc for its daily broadcast from 1000 to 1130, and Capt. Williamson has logged Singapore on its old channel of 4780 kc at 1500. The new commercial service of Radio Ceylon was logged by J. C. Catch on 11771 kc at 1600 on October 29; he noted that a series of chimes very much like those used by Lourenco Marques were given on the quarter-hour, followed by the announcement: "This is the Commercial Service of Radio Ceylon." This station usually closes at 1630 with the air: "Strike Up The Band." Latest frequencies in use are: 11975 kc, 7190 kc, and 3320 kc from 1130 to 1630; 21620 kc from 2330 to 0130.

Srinagar, 4860 kc, is heard regularly by Capt. Williamson from 1600 to 1640,

at which time a lady pronounces the direction: "Radio Kashmir." T.B.W. hears the 60-metre Indian quartet as follows: VUB<sub>2</sub>, 4840 kc (S7); VUC<sub>2</sub>, 4880 kc (S5); VUM<sub>2</sub>, 4920 kc (S6); and VUD<sub>2</sub>, 4960 kc (S8). At 1530 there is News in English over VUB<sub>2</sub>, VUC<sub>2</sub>, VUM<sub>2</sub> and Srinagar, but not on VUD<sub>2</sub>. English talks are given over VUM<sub>2</sub> at 1600 (announces as "All-India-Radio, Madras"), and a relay of UN proceedings in English over VUD<sub>2</sub> at 1645 (announces as: "This is Delhi"). W. G. Gore (Yatesbury, Wilts.) heard VUD<sub>10</sub>, 17830 kc, at 1340; and over VUD<sub>7</sub>, 15160 kc, at 0657 on November 4, we were privileged to hear a running commentary in English on the first unofficial cricket Test Match between India and the British Commonwealth XI, on tour in the sub-continent.

Capt. Williamson hears consistent but weak signals daily from Radio Goa, Portuguese India, on 9610 kc. On Sundays, a Portuguese programme concludes at 1540 with the words: "Muy bono noite"; then comes the direction: "Good evening, ladies and gentlemen—This is Radio Goa." The broadcast following is a religious feature in English, and at 1615 the direction is repeated: "You are listening to the English programme from Radio Goa." Their verification gives the transmitter as CR8AA operating on 9610 kc from 0130 to 1730 daily (Sundays, 0230-1730). T.B.W. also gives Radio Pakistan on a new outlet of 7098 kc with tremendous signals at 1645. His other capture is Ramallah in the Arab sector of the city of Jerusalem and formally incorporated in the State of Jordan; it operates on 7125 kc. It signs on at 1500 with the words: "Good Afternoon. This is the Hashemite Broadcasting Station calling from Jerusalem on 413 and 42.5 metres." On Wednesdays at 1500 there is a record-request programme entitled: "Chosen By You," and the News in English follows at 1600. Other programmes are in Arabic, and the direction is often abbreviated to: "H.B.S."

Saidi-Arabia provides a good signal on 11950 kc from 1800 to 1845 daily, and Syria may be heard on 7145 kc, 6000 kc, and 12000 kc, with News in English at 1100 and 2130. W. G. Gore heard the new TAS, Ankara, 7285 kc, with a powerful signal in its English transmission commencing at 2100.

Lastly, Radio Lebanon, Beirut, provided a highly entertaining feature over 8036 kc at 1500 on November 12. H.M. King George VI's voice was heard (a

recording of His Majesty's speech made on the occasion of the opening of the Colonial Exhibition in London), after which we were taken by magic carpet to Fiji (native music heard), to Hong Kong harbour watched over by seven jagged hills (Oriental music in the background), to the Crown Colony of Singapore, where we listened to the Angelus and the Imam of the Muslims calling the faithful to prayer; then on to Nairobi, where Africans, Asians and Europeans meet on equal footing, to Malta G.C., whose Prime Minister welcomed us, to the Gold Coast (a greeting on native drums), thence *via* Bathurst in the Gambia across the ocean to the West Indies. In Trinidad we listened to the calypso, consisting of words extemporised on a topical theme, and finally to sunny Bermuda, where a song with banjo accompaniment bade us welcome to this island health resort.

### Africa

In South Africa, Cape Town, ZRK, 5885 kc, was good on November 1. *Listeners' Magazine* from 1930 to 2000 was followed by the pips time-signal, the direction: "This is the South African Broadcasting Corporation," and the words: "Here is the News."

At 2005, after a gale warning, we heard a preview of the morrow's chief programme, which was entitled: "Sir Ernest Shackleton's Expedition to the Antarctic in 1914."

Salisbury, Southern Rhodesia, was fair on 3320 kc at 1755 on November 16, when stock market prices from the Johannesburg Exchange were quoted. This station was still audible at the close at 2000 with the playing of: God Save The King.

J. C. Catch has heard Lourenço Marques on 15192 kc and on 11761 kc (checked). Commercial announcements were followed at 1730 with chimes and call in English. Capt. Williamson hears CR5SC nightly on 4810 kc between 1930 and 2100. Programmes are in Portuguese with a News at 2000, and it closes with the words: "A qui Sao Tomé-Radio Clube de Sao Tomé e Principe," and the playing of: A Portuguesa. T.B.W. also hears FIQA on a new frequency of 9514 kc between 1500 and 1700 with the following details: 1500-1600: Request records (French songs and American dance music); 1600: the announcement: "Nous vous donnons l'heure locale—dix-neuf heures à Tananarive," followed by a trumpet fanfare and a male announcer shouting

the direction: "Ici Tananarive"; 1601: News Bulletins; 1601, Nouvelles de France et l'Union Française; 1605, Nouvelles de l'Etrange; 1610, Nouvelles Locales. S. A. Mann also reports FIQA on 9515 kc signing on at 0330 with La Marseillaise and News in French; he says that they open up simultaneously on the old frequency of 9603 kc, but with programmes in Malagache. T. B. Williamson offers CR6RD, Nova Lisboa in Angola on 11925 kc, heard at 1900, with the direction: "Radio Clube de Nova Lisboa."

Brazzaville has been found by a newcomer, A. S. Brown (Gatley, Cheshire), who heard them on 6024 kc with News in English at 2055. R. J. Riding (Fibbersley, Staffs.) hears them regularly at 1815 and 2050 on 11970 kc, and forwards the times of their English Newscasts, which are at 0515 and 1015 over 15595 kc (50 kW), and at 1815 and 2050 over 11970 kc (50 kW) and 9440 kc (7 kW). J. S. Martin (Mauchline, Ayrshire) recently received a letter from Radiodiffusion et Télévision Française, in which the following addresses were given: "Radio Brazzaville, Brazzaville, Afrique Equatoriale Française"; "Radio Dakar, Dakar, Afrique Occidentale, Française"; and "Radio Saigon, Saigon, Indo-Chine."

Station ZOY, Accra, Gold Coast, on 4915 kc, has been quite good around 1745 during the past month. On Armistice Day, at 1725, they offered a special programme, which included the playing of such old favourites as: Pack Up Your Troubles, Tipperary, Roll Out The Barrel, and a mention of the Battle of El Alamein. Normally, an English News is given at 1745, and at 1759 you will hear the words: "You have been listening to a programme from Accra—We shall be on the air again at 8 a.m. tomorrow. — Good-night, Everybody," followed by the playing of the National Anthem.

Cairo, through SU'X, 7860 kc, opens up with the tuning note and half-hour clock chimes at 1830, followed by the direction: "Hoona Kahira" and a March. The Sudan Broadcasting Service's station in Omdurman opened on November 17 at 1730 with a statement of its wave-lengths, namely, 30.78, 50.20 and 524 metres. At 1745 a talk entitled "Late Night Final" by Sheriff Mohammed Fayhid explained the organisation and distribution problems of the newspaper, *Sudan Star*.

R. A. Savill has received from 15, Avenue du Congo, Rabat, a letter veri-

fication for Radio Maroc; the frequencies now used are 6006 kc and 7214 kc. Capt. Williamson hears them on the former frequency between 2200 and 2300, during which period they play dance records three at a time, *i.e.*, three rumbas, three waltzes, and so on. At 2255, a News Summary is followed by the direction: "Ici Rabat—Radiodiffusion Marocaine." Finally, at 2300, there are chimes, the words: "Ici Radio Maroc—Bon Nuit," and the playing of an Oriental tune and La Marseillaise.

R. J. Riding hears the United Nations broadcasting at 1930 through the facilities of the Tangier relay station WWH53 on 13471 kc, working in parallel with WRCA2, 11770 kc, and WABC5, 15130 kc. C. P. Turner (Crewe) has received a six-page schedule and a blue and white verification card from WER47, 17900 kc (1900-1915 daily) from United Nations at Lake Success. R. A. Savill has just received his card for CR4AA, Radio Clube de Cabo Verde, Praia, Cape Verde Islands, which operates on 5895 kc; and T. B. Williamson tells us that CSA93, Ponta Delgada, 4845 kc, opens at 2100 with a truly massive signal and the call: "A qui Ponta Delgada, Emissora Regional dos Açores, Emissora Nacional."

### Europe

We have before us a letter from the Ministère de l'Information, Radiodiffusion Française, Paris, informing us that the nightly broadcasts in English are now given between 1945 and 2100 over 6145 kc and 6200 kc. The latest programme schedule emphasises that the French-English lesson is given from 1845 to 1900 daily.

J. S. Martin recommends this "English Hour" from Paris. He has received from François Gromaire, Assistant Director, British Service, a letter which concludes with the words: "Do not forget that any criticisms and suggestions from you are always welcomed."

R. A. Savill has received from Sociedad Espanola de Radiodiffusion, Direccion Technica, Avenida de José Antonio 32, Madrid, a well-illustrated coloured brochure about Radio Mediterraneo, Valencia, on 7037 kc; and C. P. Turner possesses a card from Radio Nacional de Espana, Madrid, which operates on 9368 kc. R.A.S. says that former CS2WI, Radio Club Portugues is now CSB51. A card received within seven days of sending his report gives the frequency as 12865 kc and the power 250 watts.

The Forces Broadcasting Station in Malta has been logged by J. C. Catch on 6015 kc with a relay of BBC News at 1800, and *Australian DX'ers* suggests that Eire uses 17840 kc between 1730 and 1750 daily for the daily broadcast of News and Market Reports. According to T. B. Williamson, Radio Budapest, Hungary is heard consistently at 2100 with News in English on 9832 kc, and not on 9820 kc, as widely quoted. T.B.W. also mentions three Greek transmissions: Athens II is strong on 7050 kc, with musical items around 1600, and announces clearly as: "Radiophonikos Stathmos Enoplon Dhymameon"; Macronissos is heard on 7100 kc at 1800; and Jannina on 6900 kc at 1200, but both these stations are "frequently hopping all over the band." Jannina is now on 6224 kc from 1930 to 2200. B. P. Middleton gives Athens with English News on 9607 kc at 1935; the announcer asks for reports to be sent to: 4 Rigillis Street, Athens. The Greek Armed Forces station at Kavala on 7590 kc can be heard at good strength with classical music at 1825, and yet another new 1 kW transmitter is on 6330 kc. This is the Central Broadcasting Station of the Greek Armed Forces, Athens, and comments will be greatly appreciated by Major John Theodorou.

### Latin America

LRA1, Radio El Estado, Buenos Aires, 6900 kc, has been logged by J. C. Catch at 2300 (S4). It is reported that this one has recently increased power from 10 to 100 kW and is again broadcasting in English from 0001 to 0500 daily. R. A. Savill says that OAX4Z, Lima, Peru, 5895 kc, is usually well heard from 2330 onwards; he finds their mixed 2330 programmes highly entertaining.

From Brazil, R.A.S. has a card for PRA8, Radio Club de Pernambuco, on 6015 kc; it reads: "Dear Listener-Friend,—We wish to thank you for your co-operation and valuable information with reference to the reception of our programmes transmitted simultaneously in 720 kc and 6015 kc. *Hopping* (sic) you will continue to enjoy our Brazilian popular music, and thanking you again for your kind attention, which we greatly appreciate. We remain, dear friend, Yours with our best regards, PRA8, Radio Club de Pernambuco, S.A., Brazil." ZYC2, Rio de Janeiro, is using 9504 kc, according to J. C.

## SMALL ADVERTISEMENTS

**CHARGES: Readers', 2d. per word, minimum charge 3s. Box Nos. 1s. 6d. extra. Trade, 6d. per word, minimum charge 7s. All advertisements must be of radio interest only. Add 25% extra for Bold Face (heavy type) announcements. Copy date for next issue, January 6, addressed Advertisement Manager, Short Wave Listener, 53 Victoria Street, London, S.W.1.**

**QSL CARDS AND LOG BOOKS. AP-PROVED G.P.O. SAMPLES FREE. ATKINSON BROS., PRINTERS, ELLAND, YORKS.**

9in. Magnetic CRT, VCR516 37/6. Deflector coil 10/-, BC455, 40/-, Class-D Wavemeter—Offers? VU29, 10/-, CV43, 5/-, German Valves RS291, RL12P35, RL12P50, LV1, RV2P800, etc. State wants. Dixon, 23 Wye Street, Ross-on-Wye.

**FOR Sale**—one Type AR88LF, in first-class condition, £40. D. Chapman, Brinklow, Rugby.

**COLLINS** Com. Rx, £5. 3 vols. *Modern Practical Radio & Television*, £2/10/0. Miscellaneous gear. Callers only. Sides, Bankside, Holyhead Road, Oakengates, Shrops.

**R.1116** eliminator, speaker, perfect. Rx cost £7/10/0. Bargain, £5. plus carriage. Exchange R.1155. Wanted RX18 or TR38 cheap. Cartwright, 17 Barowby Lane, Austhorpe, Leeds.

Catch, and ZYS8, Manaos, 4805 kc, was heard at 2145 with the tune: "Sing As We Go" by T. B. Williamson. Dr. Williamson further mentions one on 4934 kc, heard at 0455 with an English language play. It closed at 0500 with indistinct direction in English and Spanish, and is presumably HJAR, Manizales, Colombia, on 4935 kc. We logged HJCT, 6220 kc, with Spanish News, at 0400.

In Venezuela, the following have been spotted by J. C. Catch: YVKB, Caracas, 4890 kc, at 2230, with chimes, call: "Radiofusora Venezuela," and Tune: "Anchors Aweigh"; YVMG, Maracaibo, 4810 kc, at 2245, with call: "Radio Popular"; and YVKF, Ondas Populares, Caracas, 4879 kc, with the following items: 2315-2325, English Commercial programme; 2325-2345, Spanish Programme; 2345-2355, English News, World and Local. J.C.C. mentions that this News is heard regularly at good strength at this time. C. P. Turner has yet another card from HCJB, Quito, for 17890 kc; his mail includes folders with pictures of the layout of this station, whose directors have

**R.1224A**, hardly used, perfect order, £2/10/0. Army 18 Set, 10/-, V55R, converted for DC, £8. Box: 039.

**R1082** coils wanted, state price and particulars to: T. A. Blair, 14 Drumard Drive, Coleraine, N. Ireland.

**FOR Sale.** R107 communications receiver, as new, £8/10/0 or near offer. Drake, 29 The Homing, Meadowlands, Cambridge.

**EDDYSTONE** 2 metre converter to correct specification, new condition, £9. Eddystone test oscillator 3.5 up to 80 mc, with plug-in coils, £6 less power pack. Admiralty wavemeter Type 56 with charts, £4/10/0. R.A.F. 1155, with power pack and speaker, £11. Offers to 68 Middle Park Road, Birmingham, 29.

**BC221** Frequency Meter, perfect, complete with brand new Butler stabilised power pack, £12/10/0. G. Sewell, 243 St. Helens Road, Bolton, Lancs.

sent him a miniature pair of Indian moccasins.

B. Mercer (Hulme, Manchester) has been lucky enough to hear that rare one in Barbados, the Cable and Wireless station at Bridgetown, on 7547 kc; it was audible from 2020 until 2135 on November 11. B.M. says that it broadcasts during the Race meetings held during March and November each year; this was the last broadcast of the season, but the transmitter will be relaying the commentary on the cricket match between Barbados and Trinidad to be played next February. Capt. Williamson has heard ZQI, Kingston, Jamaica, on 4950 kc with an S9 signal at 0230; as it is now a commercial broadcasting station, it advertises cruises round the Caribbean!

Please send in more and more reports; by so doing you will assist in making these comments even more useful and up-to-date. Address: R. H. Greenland, *Short Wave Listener and Television Review*, 53 Victoria Street, London, S.W.1, to reach this office not later than January 15. And a very happy New Year to you all.

# SHORT WAVE BROADCAST STATIONS

Revision 16.90-25.19 Metres

## Giving Frequency, Wavelength, Callsign and Location

These lists appear each month, covering the 11-128 metre section of the wave band within which all short wave broadcasting services of the world operate. For economy of space, this band is dealt with in five sections, a list of active stations in one of the sections being given in full every month. Such revision is necessary due to constant changes of frequency, callsign and operating schedules. All stations appearing in our lists are normally receivable in this country and are under regular observation.

Fre- quency	Wave- Length	Callsign	Location	Fre- quency	Wave- Length	Callsign	Location
17750	16-90	WRUL4	Boston, Mass.	15210	19-72	VUD11	Delhi, India
17730	16-92	GVQ	London			VLG11	Lyndhurst, Aust'lia
17715	16-93	GRA	Colombo, Ceylon				Tangier
17700	16-95	GVP	London	15200	19-74	VLB6	Moscow
17678	16-97	CS5SB	Sao Tome			VLC	Shepparton, Aust'lia
17445	17-19	HVJ	Vatican City			WLWO1	Limbourne
15910	18-86	HSJ4	Bangkok, Siam	15194	19-74	TAQ	Cincinnati, Ohio
15624	19-20		Madrid	15191	19-75	CR7BG	Ankara, Turkey
15595	19-24		Brazzaville	15190	19-75	OLX4	Lourenco Marques
15440	19-43	RW98	Moscow			CKCX	Bjorneborg, Finland
15435	19-44	GWE	London	15180	19-76	GSO	Shepparton, Canada
15405	19-48	PZC	Paramaribo				London
15390	19-49	RW99	Moscow				Noumea, New Cale'nia
15364	19-52	ZYC9	Rio de Janeiro	15170	19-78	LKV	Moscow
15350	19-54	WRUL1	Boston, Mass.			TGWA	Oslo, Norway
		WLWO5	Cincinnati, Ohio				Guatemala City
		VUD8	Delhi, India	15165	19-78	OZH	Moscow
			Paris			ZYN7	Copenhagen
			Luxembourg	15160	19-79	VUD5	Fortaleza, Brazil
15347	19-55		Dakar, Senegal			VUD7	Delhi, India
15345	19-55		Athens, Greece			VLB11	Delhi
15340	19-56	RI02	Moscow				Shepparton
15335	19-58	APDI	Dacca, Pakistan	15155	19-80	ZYB9	Moscow
			Munich			SBT	Sao Paulo, Brazil
15330	19-57	WGE01	Schenectady	15150	19-80	YDC	Stockholm, Sweden
		WGE02	Schenectady			WRCA6	Djakarta, Indonesia
			Honolulu	15147	19-81	CSA34	New York
			Manila, P.I.	15145	19-81	ZYK2	Lisbon
15320	19-58	CKCS	Sackville, Canada	15140	19-82	GSF	Pernambuco
		VLC4	Shepparton, Aust'lia				London
		VLG6	Lyndhurst	15135	19-82		Moscow
		RW97	Moscow	15130	19-83	WABC5	Sao Paulo, Brazil
15315	19-59		Rome, Italy			KRCA1	New York
15310	19-60	KCBR2	Los Angeles			KRCA2	San Francisco
		WRUL3	Boston, Mass.			KCBR1	San Francisco
			Moscow	15120	19-84		Los Angeles, Cal.
15305	19-60	HER6	Berne, Switzerland				Colombo, Ceylon.
15300	19-61	GWR	London	15115	19-85	HCJB	Rome.
			Singapore	15110	19-85	GWG	Quito, Ecuador.
15290	19-62	LRU	Buenos Aires				London.
		VUD3	Delhi	15105	19-86	GKE11	Moscow.
		VUD9	Delhi	15100	19-87	EPB,	San Francisco.
		VUD10	Delhi				Teheran, Persia.
		WRUL1	Boston, Mass.	15095	19-87	HVJ	Paris.
15285	19-63	WBOS1	Boston, Mass.			CKLX	Vatican City.
15280	19-63	ZL4	Wellington, N.Z.	15090	19-88	CBLX	Sackville, Canada.
		RW98	Moscow			GWG	Montreal.
			Tangier	15070	19-91	GWC	London.
			Munich	15060	19-93	V3USE	Mauritius.
15270	19-65	WABC2	New York				Peking, China.
		RW98	Moscow	15032	19-96	ETA	Addis Ababa, Eth'pia
			Karachi, Pakistan	12875	23-30	CSB51	Lisbon.
15260	19-66	GSI	London	12749	23-53	CS2MP	Lisbon.
15250	19-67	WLWO5	Cincinnati, Ohio	12460	24-08	HCJB	Quito, Ecuador.
			Manila, P.I.	12175	24-64	TFJ	Reykjavik, Iceland.
			Tangier	12095	24-80	GRF	London.
15240	19-69	KRCA3	San Francisco	12080	24-83	FZP8	Papeete, Tahiti.
		VLG6	Lyndhurst	12040	24-92	GRV	London.
			Paris	12003	24-99	CE1180	Santiago, Chile.
15235	19-69	JBD4	Kawachi, Japan	12000	25-00		Damascus, Syria.
		BED3	Taipeh, Formosa	11975	25-05		Colombo, Ceylon.
			London	11970	25-06		Brazzaville.
15230	19-70	GWD	London	11960	25-08		Djeddah,
		VLC4	Shepparton				Saudi-Arabia.
		VLG6	Lyndhurst	11950	25-10	ZPA5	Moscow.
		WLWO1	Cincinnati, Ohio				Encarnacion,
			Moscow				Paraguay.
15225	19-70	JBD3	Kawachi, Japan	11935	25-14		Moscow.
15220	19-71	ZL10	Wellington, N.Z.	11930	25-15	GVX	Basra, Iraq.
		PLJ	Hilversum, Holland	11925	25-16	CR6RD	London.
			Buenos Aires	11920	25-17		Nova Lisboa, Angola.
			New York	11915	25-18	LRA	Moscow.
15210	19-72	WRCA6	New York	11910	25-19		Buenos Aires.
							Budapest, Hungary.

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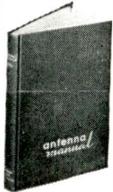


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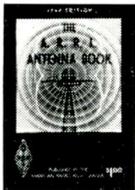


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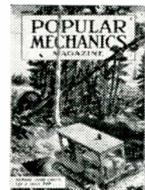
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